

NETWORK WORLD

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► DEREGULATION

FCC set to kill AT&T rate rules

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The Federal Communications Commission is expected to propose at a meeting tomorrow major rule changes that could free AT&T from rate-of-return strictures and move the carrier a giant step closer to total deregulation.

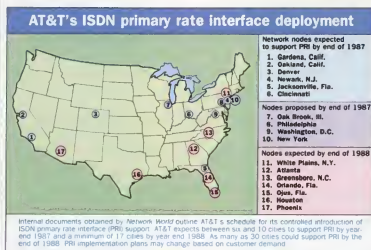
The possibility of such a sweeping policy change four years after the breakup of the Bell System is spurring intense debate among users, vendors and telecommunications policy makers. Proponents of the FCC's proposal to drop

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► EXCLUSIVE

AT&T ISDN plans exposed

Internal report: Primary rate interface introduction lags.



BY BOB WALLACE
Senior Editor

BASKING RIDGE, N.J. — AT&T's implementation of the ISDN primary rate interface (PRI) is moving more slowly than anticipated, although the carrier hopes to have as many as 30 network nodes outfitted with PRI support by year-end 1988, according to an internal status report obtained by Network World.

The report was written to update key AT&T officials on the "controlled introduction" of Integrated Services Digital Network PRI support in the carrier's long-distance network. It explains where AT&T will first implement

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OPEN SYSTEMS: HOW OPEN ARE THEY?

Wang opts for the open road But can it erase its old word processor image?

BY PAM POWERS
Senior Editor

Ask Wang Laboratories, Inc. if it has met its enemy and it will respond in the affirmative. The enemy Wang is still trying to conquer is of its own creation — it's the word processor.

In the new era of open networking, us-

ers diligently seek out vendors that best provide multivendor system connectivity and adherence to Open Systems Interconnect (OSI) standards. Wang, unfortunately, is still saddled with its outdated word processor image.

But that old image belies the new Wang, which in the past three years has

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► PRIVATE NETWORKS

Texas Air building gigantic SNA net

BY PAUL KORZENIOWSKI
Senior Editor

HOUSTON — Network World has learned that Texas Air Corp. has undertaken an ambitious network overhaul that will lead to the implementation of what could be the world's largest private and largest IBM Systems Net-

work Architecture nets.

Texas Air, which has become the nation's largest airline by acquiring a number of major carriers including Continental Airlines Corp. and Eastern Air Lines, Inc., recently began consolidating more than 20 separate voice and data networks. Once the process

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NETWORK LINE

News

► General Motors and Electronic Data Systems throw open the doors to the nation's largest and only fully functioning production network based on the Manufacturing Automation Protocol. Page 2.

► A beta user lauds SynOptics Communications' plan

to support Ethernet over AT&T's Premises Distribution System wiring scheme. Page 2.

► Gateway Communications strays from its proprietary network strategy with a product barrage that includes an Ethernet card, a data base server and what it claims is the industry's first border-level net server. Page 2.

► AT&T broadens its T-1

multiplexer product line with the introduction of the Dataphone II 745 Acculink networking mux. The company also enhances its network management and voice compression offerings. Page 2.

► In an attempt to sell more hardware — and more NetWare — Novell, Inc. slashes the prices of most of its local-area networking equipment by 5% to 41%. Page 4.

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► In a Special Section on hybrid networks, Network World examines the unique blend of management skills required to successfully create these customized public/private net combinations. Page 24.

► MERGER REACTION

Bridge, 3Com pact draws user praise

Similarities called strengths.

BY PAULA MUSICH
Senior Editor

SANTA CLARA, Calif. — Users last week applauded the proposed merger of networking vendors Bridge Communications, Inc. and 3Com Corp., citing expectations of greater integration of the two firms' products.

The companies, which on July 24 agreed to merge through a stock swap, share many of the same customers because their products and networking expertise complement each other, users said. "We use both companies' products in our network, and I think we'll probably see better integration," said Michael Oubre, MIS operations

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► **FACTORY NETWORKING**

Largest MAP net bows

GM opens state-of-the-art truck plant.

BY BOB WALLACE
Senior Editor

EAST PONTIAC, Mich. — Culminating more than three years of exhaustive preparation, installation and systems integration, General Motors Corp. and Electronic Data Systems Corp. (EDS) officials last week threw open the doors of GM's truck assembly plant here to reveal the auto industry's largest and only fully operational production MAP network.

As first reported in *Network World*, the plant's entire factory-floor automation system is con-

trolled by a single, facility-wide, broadband communications network compatible with Version 2.1 of the Manufacturing Automation Protocol specification.

MAP allows vendor equipment produced by multiple vendors to communicate over a single broadband, token-passing bus-based local-area network.

This plant is the lead factory in a three-plant MAP networking project known as Truck & Bus. MAP networks have also been installed in GM's Fort Wayne, Ind., and Oshawa, Ontario manufacturing facilities. GM has also begun installing

MAP-compatible nets in other factories, such as the Saginaw (Mich.) Steering Gear Plant and certain Chevrolet-Pontiac-Canada group plants.

GM also announced for the first time last week its intention to use MAP networking technology in its Saturn manufacturing plant in Tennessee.

Ernest Vahala, director of manufacturing engineering operations for the GM Truck & Bus Group, said 32 miles of broadband cable with 2,000 taps were used in the East Pontiac and Fort Wayne plants. Some 200 total MAP nodes, supporting roughly 2,000 intelligent devices over completely redundant cable systems, are installed in these two plants.

Gerald Elson, GM executive director of artificial intelligence ad-

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► **TWISTED-PAIR ETHERNET**

User lauds

SynOptic system

LattisNet tool a success on PDS.

BY PAULA MUSICH
Senior Editor

NEW YORK — While some doubt the wisdom of running Ethernet over unshielded twisted-pair wire, one beta user has given thumbs-up to a SynOptics Communications, Inc. product that supports Ethernet over AT&T's Premises Distribution System (PDS) wiring scheme.

Although consultants question how much usable unshielded twisted-pair wire is available in most buildings and whether the medium can support the 10M bit/sec data rate of Ethernet over adequate distances, support for Ethernet over telephone wire is picking up steam.

In January, SynOptics announced intentions to develop a PDS version of its LattisNet product, which allows Ethernet to run over IBM's shielded twisted-pair Cabling System. The firm, however, released no details on the product, saying only that AT&T would work with SynOptics to certify that the product would run on PDS.

Both the SynOptics product and an Ethernet-over-twisted-pair system from 3Com Corp. are expected to be available in the fall. 3Com announced its intentions in March to

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► **BOARD-LEVEL TECHNOLOGY**

Gateway drops proprietary net stance

BY MARY PETROSKY
West Coast Correspondent

IRVINE, Calif. — In a product deluge that highlights the company's move away from a proprietary networking approach, Gateway Communications, Inc. last week introduced its first Ethernet interface card, a board-level data base server and what the company said is the first board-level network server.

Gateway also announced that its asynchronous, Systems Network Architecture and X.25 gateways now work with any network running Novell, Inc.'s Advanced Network 2.0a or above. The gateways previously worked only with the company's proprietary G/Net

local network. Network Basic I/O System-compatible versions of these products will likely be introduced this year, said Walter Schramm, vice-president of sales and marketing.

The company's board-based server, dubbed the G/Server Engine, processes all file management calls and allows a personal computer to be used as a nondedicated local net server.

Similarly, Gateway's board-level G/Database Engine intercepts and processes all data base calls. This relieves the network of the traffic typically generated when network workstations repeatedly call data stored on a server while executing data base activities, such as sorting.

"As networks get larger, you need to increase performance, and that's the reason behind the engine products," Schramm said.

Both products evolved from the same card, which contains an Intel 80186 microprocessor, disk controller and 1M byte of memory. Each card can control two disk drives possessing up to 140M bytes each.

Either engine can be installed in an IBM Personal Computer, Personal Computer XT, Personal Computer AT, PS/2-30 or compatibles for use on NETBIOS-compatible local networks. Both the server and data base engines are priced at \$2,150 and will be available in September.

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NEW PRODUCTS AND SERVICES

Data Switch introduces a network control system to monitor, configure and control a network of DSM data switches. **Page 17.**

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► **MULTIPLEXER MARKET**

AT&T embellishes T-1 multiplexer offerings

BY PAUL KORZENIOWSKI
Senior Editor

BASKING RIDGE, N.J. — AT&T propped up its T-1 multiplexer offerings last week with the addition of a networking multiplexer, upgraded its network management system's capabilities and enhanced its BCM3200 Solitaire voice compression unit.

AT&T's Dataphone II 745 Acculink multiplexer supports up to 16 T-1 lines, which operate at speeds up to 1.54M bit/sec. In March, AT&T announced its first T-1 multiplexer, the 740 Acculink, which supports a point-to-point connection.

The 745 Acculink is compatible with D4 framing and Extended Super Framing, carrier standards for T-1 lines. The product conforms to DS1 formatting, which divides a T-1 line into 24 64K bit/sec channels, and DS0 formatting, which

enables a user to split and reroute one 64K bit/sec channel off a T-1 link.

The multiplexer can be used with such AT&T services as Acculink T1.5, Digital Access Cross-connect, Service/Customer Controlled Reconfiguration (CCR), M24, M44 and Megacom 800.

Rerouting feature

The 745 Acculink features automatic rerouting so data can be

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LOCAL NETS

Novell slashes prices on most LAN hardware

BY MARY PETROSKY
West Coast Correspondent

PROVO, Utah — Novell, Inc. last week announced an immediate price cut of 5% to 41% on most of its local-area network hardware products.

Prices on all network servers, disk storage subsystems and add-on drives are being reduced, along with half of Novell's line of network interface cards. The company's G-net and S-net cards are not being reduced in price.

In making the price cuts, the company is passing along savings from its own suppliers and looking to push more hardware, acknowl-

edged Cheryl Snapp, manager of corporate communications.

Novell has repeatedly stated that one of its goals is to help the networking industry grow, and reducing the price of hardware is one way to accomplish that, Snapp said. "Anything we can do to lower the cost of hardware enables us to sell more NetWare," she added, alluding to the company's local-area network operating system.

The biggest drop was a 41% cut in the price of Novell's ARCnet network interface card, RX-Net, which went from \$595 to \$350, according to Lew Heaps, senior product manager. Novell had previously announced a 20% reduction in

the price of its E-Net Ethernet adapter, from \$495 to \$395. That cut is now effective.

The price of the NetWare 286B file server, configured with 183M bytes of storage and a starter kit for three G-Net nodes, has been cut 26%, from \$20,170 to \$14,970. The price of the 183M-byte version of the stand-alone 286B file 28%, from \$18,595 to \$13,395.

The 109M-byte version of the 286B server got a 20% price reduction, from \$13,995 to \$11,195. Prices for the 42M-byte version of the 286A server fell 5%, from \$7,495 to \$7,095.

The NetWare Drive Subsystem NDS4 with 109M bytes of storage previously sold for \$7,095 and is now priced at \$6,395, a 10% reduction. Pricing of add-on drives fell more sharply. The 183M-byte add-on drive went from \$9,395 to \$5,795, a 38% cut, while the 109M-byte version saw a 25% cut, from \$4,795 to \$3,595. □

Largest MAP net bows

continued from page 2

tivities, said at the event, "In many of our plants we are taking a much closer look at our plant floor communications and the associated costs. We urge other users to do the same. We expect they will be surprised at the cost of proprietary communications vs. MAP."

The overall cost of the Truck & Bus project and the per-device connection cost of the project were not available. A Truck & Bus official estimated last year that installation of the network at the East Pontiac plant would exceed \$1.5 million.

Automated systems connected to the MAP network here include 143 robots, nine modular paint booths, 350 programmable controllers and 25 cell controllers. The plant is wired with roughly 20 miles of broadband, coaxial cable. An Industrial Network, Inc. (IN) MAP/One local-area network operates over the coaxial cable, as does an Underman-Bass, Inc. Net/One local area, which serves the needs of the technical offices in the plant. The two networks are not connected.

A GM official said a Technical and Office Protocol-compatible network was not used for this application because a fully developed TOP specification was not available when the facility networking decisions were made.

Hewlett-Packard Co.'s HP 1000 cell controllers and Digital Equipment Corp. VAX area managers are widely used in all three plant networks. Robots for the three plants were provided by GMP Robotics, Inc. and Cincinnati Milacron Marketing Co. The robots are equipped with INI MAP boards that allow them to hook to the plantwide net. Both Allen-Bradley Co. and Simpact Associates, Inc. also provided equipment for use in the Truck & Bus project.

The DEC VAX computers deliver truck-building data over the MAP network to the HP cell controllers. These cells then provide data on

demand to the devices, such as painting robots, that they support. The cell controllers also collect data from the devices they monitor and send it back over the INI MAP network to the DEC VAXes, which act as area controllers. Each VAX controls the operation of multiple cells.

Frank Palopoli, plant manager for the East Pontiac factory, said the plant's skilled trade employees, whose job it was to help install and now maintain the new equipment, received a total of 760,000 hours of training in the classroom and in

tool shops and vendor offices. He added that the majority of the plant's 2,200 employees spent two weeks in classroom training before beginning work.

Installation of a MAP network in the Fort Wayne plant began last summer. Charles Katko, vice-president and group executive of GM Truck & Bus Group, said Truck & Bus technicians are working with EDS and GM Hughes Electronics, Inc. personnel to bring the MAP network on-line. Information on the status of the MAP project in Oshawa was not available. □

Gateway drops net stance

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The G/Database Engine has a series of commands that vendors of data base software must support in their products. Gateway has been working with an unspecified number of vendors to help them port their software to the data base engine, Schramm said.

Currently, Cosmos, Inc.'s Revelation, Data Access Corp.'s DataFlex and Texas-based SoftCraft, Inc.'s Btrieve are supported by the data base engine.

Gateway is offering its new G/Ethernet network interface card in order to widen its line of network offerings, Schramm said. The company previously sold only its proprietary network, G/Net. G/Ethernet was designed to IEEE 802.3 specifications and contains 32K bytes of memory, Schramm said.

In its initial release, the card will support Novell's NetWare operating system, as well as the Transmission Control Protocol/Internet Protocol developed for the Department of Defense. The card is priced at \$395 and will be available Sept. 1.

The three gateway products, aimed at Novell NetWare-based networks, will also be available Sept. 1. The asynchronous and X.25 gateways operate at speeds up to 19.2K bit/sec, and the SNA gateway operates at up to 56K bit/

sec. The company says none of the gateways require a dedicated personal computer.

The G/Asyn Gateway, priced at \$1,440 for a four-port version, provides network users with access to modems and other asynchronous devices.

G/Asyn Gateway is bundled with two asynchronous communications applications that provide features such as automatic login and terminal emulation, as well as support for remote personal computers and terminals.

The gateway can be configured with up to 16 ports and supports connections to local or remote devices with one session per port.

The G/SNA Gateway provides emulation of an IBM 3274 Model C cluster controller, allowing up to 32 personal computers on a network to emulate 3278 and 3279 terminals, with up to four simultaneous host sessions per personal computer.

The gateway, priced from \$2,530 for an eight-user version to \$4,530 for a 32-user version, also supports 3770 emulation and file transfer as well as IBM's hybrid 3270 file transfer.

Up to 32 users can access the G/X25 Gateway & Bridge simultaneously, with a maximum of four simultaneous sessions per user. Priced at \$2,495, the product's software features terminal emulation and packet assembler/disassembler functions. □

NETWORK WORLD

Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
617-879-0700

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Bruce Hoard
Managing Editor
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Features Editor
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Karyl Scott
1273 National Press Building
14th Street NW
Washington, D.C. 20045
West Coast Correspondent
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Suite 600
San Francisco, CA 94107
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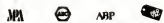
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Washington Update

BY KARYL SCOTT
Washington, D.C., Correspondent

WASHINGTON, D.C. — Communications Satellite Corp. (COMSAT) and Computer Sciences Corp. (CSC) have joined forces to bid for a five-year, \$500 million global data, video and voice networking project for the U.S. Department of State.

CSC would serve as prime contractor for the Department of State Telecommunications Network (DOSTN) project and provide systems integration services. The secure network will link as many as 300 U.S. embassies and consulates around the world. COMSAT would provide satellite transmission services needed to link international sites.

CSC and COMSAT are the first companies to announce plans to bid on DOSTN. The final request for proposal is expected to be issued later this year and an award made by the middle of next year. Construction of the network will be completed in 1992, according to State Department officials.

■ A group of state public utility commissioners has accused US West, Inc. of exerting political pressure to win favorable regulatory treatment in exchange for locating a new research facility in one of the states it serves.

Regulators from five of the 14

states in which US West operates charged the telephone company with using the promise of the research facility to pressure state utility commissioners and legislators to deregulate carriers in their states.

The commissioners also charged US West with forcing the states into a bidding war for the research facility, which will employ 1,500 people and have an annual budget of \$200 million.

Regulators from Arizona, Iowa, Washington, Montana and Utah issued a statement at the recent National Association of Regulatory Utility Commissioners summer meeting in San Francisco, condemning US West's tactics.

"US West has attempted to win favorable rate case consideration, to influence state legislatures to deregulate local telephone operations and to apply political pressure to prevent the commissioners from expressing their views on US West's tactics," the statement read.

In response, US West issued a statement saying, "We are disappointed by the regulators' statement. We resent and deny any accusation that we have attempted to improperly influence regulatory decision-making."

US West admitted, however, to advocating a loosening of regulatory restrictions in the states in which it operates. □

AT&T ISDN plans exposed

(continued from page 1)

PRI support and predicts that some ISDN PRI services will be generally available by the second half of 1988.

The report said, "The technology is being successfully installed in the network but not as rapidly as we hoped. ISDN PRI calls are being successfully carried end to end on AT&T's Software-Defined Network Service] and [Switched Data Services], and interworking with such services as Megacom and Megacom 800 is a fact." The document did not elaborate on the term interworking, and AT&T declined specific comment on the report.

PRI defines how devices such as private branch exchanges are linked to an ISDN net. It is one of two ISDN interfaces approved by the Consultative Committee on International Telephony and Telegraphy. PRI specifies how a single T-1 1.544M bit/sec digital link is divided into 24 individual 64K bit/sec channels. Of these, 23 are B, or bearer, channels that can carry voice or data, and the 24th is a D data channel, which carries signaling messages that control the B channels.

AT&T's implementation of PRI is taking place in two phases, the report said. The first phase involves installation of necessary software for AT&T's central office switches. The second involves installation of what AT&T calls "hardware frames," which contain ISDN terminations. The report did not describe the frames in detail.

The report said AT&T facilities in at least six and as many as 10 cities will support PRI by the end of this year. Half of the nodes will be equipped with both hardware and software components, but the remainder will receive only software.

"This is expected to provide some flexibility should customers or vendors seek to influence our choice of locations," the unidentified author wrote. The report said AT&T has discussed its ISDN PRI strategy with "select customers" under nondisclosure agreements.

AT&T expects to have nodes in at least 17 and as many as 30 cities supporting PRI by the end of 1988 (see chart on page 1). A user contacted by *Network World* said he has seen documents from AT&T confirming those cities and adding 20 more, bringing the total number of proposed nodal sites to 40. However, the user said his information did not say when the additional 20 cities are expected to support active PRI nodes.

The status report said AT&T is still not in a position to announce its plans for tariffing planned ISDN PRI services.

"Best estimates suggest that customers will be able to place orders for ISDN PRI and dependent features in the fourth quarter of 1987 or the first quarter of 1988. It is anticipated that the initial controlled introduction phase will last at least six months, with general

availability in the second half of 1988," the report predicted. A small number of users beta-test a product or service during a controlled introduction.

Development of four of 11 planned PRI services has been delayed, according to the report. Three of these features, switched 64K bit/sec clear channel, Message Associated User-to-User Information (UUI), as well as other switched digital services, have been delayed because of a lack of user interest and customer premises equipment vendors, among other reasons.

The report also said the signaling conversion service has been delayed, but it did not say why.

Bob Blackshaw, a staff consultant with Omnicon, Inc., a Vienna, Va.-based standards tracking and education group, said Message Associated UUI allows a user to send information to another user across an ISDN network before a call is set up or while the call is in progress. This data travels over the ISDN signaling subnetwork known as Signaling System 7.

The report states, "The reasons for delaying [these items] are: 1. Local Exchange Carrier support for [Bipolar with 8 Zero Substitution] is expected to be minimal and therefore does not warrant expenditures to accelerate the deployment of 1B825 and [Signaling Systems 7] in the AT&T network to provide an adequate backbone." The report did not define Bipolar with 8 Zero Substitution.

Asked to comment on the report, AT&T provided a prepared statement. "AT&T cannot comment on the document's validity. But AT&T is committed to implementing the ISDN PRI in the network beginning early in 1988. To meet that goal, for example, software for the 4E11 generic switches in the network is being upgraded. AT&T will announce the capabilities that PRI in the network will afford customers when those capabilities are in place."

One industry watcher said a delay in ISDN PRI implementation would weaken user interest in the technology. Victor Krueger, a vice-president with Dataquest, Inc., a San Jose, Calif.-based communications research and consulting firm, said, "A delay would reinforce user skepticism. Users think ISDN will not be available until some distant point in the future."

Because AT&T has yet to submit pricing guidelines for PRI-based services, Krueger maintained that users will not look to ISDN to serve their immediate voice and data communications needs.

Although the service has not been tariffed, AT&T already has a pair of internal ISDN PRI beta tests under way. The first is a three-city trial that includes AT&T offices in Morristown, N.J., and in Basking Ridge, N.J. The second is with American Transtech, Inc., an AT&T subsidiary company located in Jacksonville, Fla., that provides financial services such as stock transfers and telemarketing services to AT&T, regional Bell operating companies and others. □

PRIVATE BRANCH EXCHANGES

Telex bolsters PBXs, unveils new add-ons

BY JIM BROWN
New Products Editor

TULSA, Okla. — Attempting to strengthen its competitive stance in the crowded private branch exchange market, Telex Computer Products, Inc. has introduced a flurry of new products and enhancements for its PBXs.

The new products include a PBX-resident protocol converter that enables asynchronous devices to access host computers through the switch and a higher capacity PBX port card.

The company also unveiled a new line of electronic telephones and an add-on board enabling remote telephones and terminals to link to a PBX. Also announced was a new modular PBX cabinet that enables a 256-port switch to support 512 ports. In addition, Telex introduced software that integrates a Telex Voice Message Exchange with a Telex PBX.

The products work with Telex's 60- to 1,024-line 1001 PBX and its

400- to 5,000-line 1200/5000 PBX, both of which were acquired from United Technologies Communications Co. in 1986.

"The announcements bring Telex in line with the leading PBX suppliers," said Greg Carlsted, an analyst with San Jose, Calif.-based Dataquest, Inc. He said Telex shipped 1.5% of new PBX lines in 1986 and 1.2% of all add-on lines.

According to John Rutledge, an analyst with New York-based investment firm Dillon, Reed & Co., Inc., Telex, known as a supplier of IBM-compatible terminals, acquired the PBXs to offer its customers the ability to switch data traffic via twisted-pair wire.

Analysts said Telex's Network Conversion Units (NCU) were the most significant part of the announcement. NCUs enable asynchronous ASCII terminals and personal computers linked to the PBX over twisted-pair wire to access a host supporting IBM's System Network Architecture or Binary Sync

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USERS GROUPS

ACUTA members split on deregulation plan

BY MICHAEL FAHEY
Senior Writer

MINNEAPOLIS — Members of the Association of College and University Telecommunications Administrators (ACUTA), gathered for the group's annual meeting here last week and expressed optimism about an FCC proposal to lift the rate-of-return regulations currently imposed on AT&T.

At a meeting Tuesday, the Federal Communications Commission is expected to propose dropping the profit regulations that have governed AT&T for years (see "FCC set to kill AT&T rate rules," page 1).

Many of the college and university telecommunications managers who belong to ACUTA told *Network World* they believe an end to rate-of-return regulations would drive down the cost of long-dis-

tance telephone service for business customers as AT&T fights to increase its corporate user base. (Consumer groups, however, fear residential customers would face higher prices if such regulation is dropped.) AT&T's reduction in long-distance rates would, in turn, force its competitors to lower their prices for business users, the telecommunications managers said.

"AT&T may be able to lower the price of long-distance service for large customers. That would help the universities," said Del Combs, director of communications and information systems at the University of Kentucky in Lexington.

Fred Wood, telecommunications manager at the State University of New York at Buffalo, agreed with Combs and questioned the effectiveness of rate-of-return regulations. "The carriers are able to hire sharp accountants who figure out

how to pass all kinds of costs on to the customers," Wood said. "I wonder how much good the rate-of-return limit really does. Now that it isn't a one-man show, it might be good to end the limit and make it a level playing field."

On a more cautious note, Patricia Paul, director of telecommunications at Cornell University, said, "I'd like to think that it would mean lower prices. But, in telecommunications, you never know what to expect."

Robert Cape, telecommunications director at Carnegie Mellon University in Pittsburgh, said, "I like competition, and it seems to me the fewer the ground rules, the more competition there will be. This is good for universities that are flexible and able to make changes. However, it takes a lot of staff effort to change carriers."

"Still, I'll take my chances with less regulation," Cape said. "I believe that when companies have flexibility, they are better able to react to the consumers' needs."

Too early

A less optimistic opinion of the possible outcome of ending AT&T's

rate-of-return limit was offered by Emanuel Tate, executive director at NTS Telecommunications Service, a nonprofit corporation that provides telecommunications for Northwestern University at Evanston, Ill., and Chicago's Northwestern Memorial Hospital.

"I think it is too early to be eliminating regulation of AT&T and the BOCs," Tate said. "I don't agree that ending regulation will increase competition. They still have a great deal of latitude when it comes to setting prices and designing services. There should at least be some sort of cap on what they can charge."

The FCC has, in fact, proposed a price-cap scheme to replace rate-of-return regulations.

Paula Loendorf, director of communications support services at the University of North Dakota in Grand Forks, N.D., agreed with Tate and said that in North Dakota and in other less populated states, AT&T is the only choice as an interstate long-distance carrier. Therefore, she said, eliminating rate-of-return limits is likely to lead to an increase in long-distance rates in those areas. □

FCC set to kill AT&T rate rules

Continued from page 1

rate-of-return regulation say it will spur AT&T to cut costs and prices. Opponents fear the new, less restrictive rules will be inadequate to stop anticompetitive abuses.

The FCC is expected to propose eliminating the 20-year-old rate-of-return rules that allow AT&T to recover its costs and earn 12.7% profit from its interstate telephone operations. The FCC will likely propose new streamlined rate cap rules designed to give AT&T more freedom to determine its telephone rates in response to competitive market forces.

The FCC will likely propose a price cap on basic interexchange services such as Message Toll Service, WATS and private lines, giving AT&T flexibility to raise and lower rates within a price range set by the commission. AT&T would be allowed to set prices for all other services as it chooses, according to the plan outlined by FCC Chairman Dennis Patrick earlier this year.

An FCC report entitled, "Competition Policy in the Post-Equal Access Market," issued in February, described the price cap plan as "the best balance between preventing AT&T from exploiting its market power while encouraging the introduction of innovative services and competitive prices."

The FCC is not expected to vote this week on the proposed rule changes. Instead, it is anticipated the commission will open the issue to public comment. Approval of the new rules could take six to 12 months.

Business and residential customers argue that giving AT&T more freedom to set telephone rates and determine profits could trigger a return to the anticompetitive envi-

ronment that prompted the government to break up AT&T. Users question what they believe is the current view among regulators that competition is a panacea for anticompetitive abuses.

"The FCC's rate cap idea is workable, but I don't go along with removing rate-of-return regulation at this time," said Kenneth Phillips, vice-president of telecommunications policy at Citicorp and chairman of the Committee of Corporate Telecommunications Users.

"AT&T still has a virtual monopoly in WATS and 800 services, and even though rates have declined in recent years, we could see a reversal of that trend if current rules are eliminated."

Analysts such as George Dellinger of the Washington Analysis Corp. disagree, saying AT&T is unlikely to raise rates and abuse newfound freedom because "there is significant competition out there. AT&T faces increased competition and greater risks and is entitled to keep its profits."

International Communications Association Counsel Brian Molt questions whether these rule changes will raise or lower rates and whether they will affect the diversity of service available to customers. "Let's face it, AT&T wants regulatory flexibility so it can make more money. That money has to come from somewhere. Users want the FCC to protect them from wild rate hikes."

Officials of the FCC claim the commission is not trying to get out of the business of regulating AT&T, as some critics charge. "We're trying to eliminate unnecessary regulation that is no longer effective," said Mary Beth Hess, special assistant to the chief of the Common Carrier Bureau of the FCC.

"Our objective in launching this investigation is to see if there are

better alternatives to rate-of-return regulation, rules that more effectively promote competition and increase telephone company efficiency that will benefit consumers," Hess said.

AT&T applauded the move to eliminate the rate-of-return system, which it called an obsolete and artificial regulatory model, and endorsed the concept of streamlined regulation, said company spokesman Edith Herman.

AT&T's competitors have endorsed the concept of deregulating AT&T in a dramatic reversal of their earlier opposition. US Sprint Communications Co. and MCI Communications Corp. hope that once freed, AT&T will stop cutting prices or even raise them, which would take pressure off US Sprint and MCI to cut rates also.

"Market competition is an adequate check of AT&T's pricing practices, and the FCC should let the market set prices," said John Hoffmann, senior vice-president of regulatory affairs at US Sprint.

"These rule changes will have the effect of bailing out US Sprint and MCI and artificially subsidizing the long-distance industry," said Gene Kimmelman, legislative director of the Consumer Federation of America, which opposes the change.

"Rate-of-return regulation is responsible for 50% of the rate reductions," Kimmelman said. "That's an admirable record. To eliminate regulation that's been so successful and replace it with less stringent rules is very dangerous."

The National Telecommunications and Information Administration (NTIA), a division of the U.S. Commerce Department, said rate-of-return rules have not worked well and recently endorsed their elimination ("Commerce unit urges deregulation of AT&T," NW, July 27). □

Telex bolsters PBXs, add-ons

Continued from page 5

chronous Communications protocols at 19.2K bit/sec. Previously, the 1001 linked asynchronous terminals to asynchronous hosts at 4.8K bit/sec.

Telex's 3270 NCU enables up to 16 ASCII devices to emulate IBM 3278, 3279, 3178 or 3179 terminals. It also emulates an IBM 3174 model 51B or 3274 model 51C cluster controller and enables terminal and personal computer users to switch connections between two IBM mainframes. The 3270 NCUs range in price from \$4,200 for a 4-port model to \$7,800 for 16 ports.

The firm's 5251 NCU enables up to seven ASCII devices to appear to an IBM System/34, System/36 or System/38 minicomputer as IBM 5251 Model 11 terminals. A Remote 5251 NCU emulates an IBM 5251 model 12 or 5294 cluster controller and emulates ASCII devices to access one host or eight terminals to access either of two hosts. Pricing for 5251 NCUs ranges from \$1,740 to \$5,700, while 5251 Remote NCUs range from \$2,760 to \$7,200.

A new, higher capacity PBX port card for the 1001 eliminates the four to six cards previously needed to support 32 ports. The \$4,992 ONS-24 supplies 24 analog and eight digital ports, each of which supports three telephones.

The firm's new Remote ASCII Line Unit (RDLU) enables up to 192 terminals, personal computers or digital telephones to be located up to 3.8 miles from the 1200/5000 PBX. RDLUs transmit to the PBX over a fiber-optic link operating at up to 8.1M bit/sec. Priced between \$550 and \$650 per port, RDLUs support 19.2K bit/sec asynchronous and 64K bit/sec synchronous data channels as well as voice. □

INDUSTRY UPDATE

Timeplex earnings skyrocket

Timeplex, Inc. closed its fiscal year with soaring growth in earnings. For the year ended June 30, 1987, earnings increased 105% to \$19.5 million, as compared to \$9.5 million last year. Revenue grew 24% to \$147.2 million from the \$119.1 million contributed last year.

BOC second-quarter earnings profile

	1987		1986	
	Revenue	Earnings	Revenue	Earnings
Ameritech	\$2.37b	\$275.8m	\$2.35b	\$284.5m
Bell Atlantic Corp.	\$2.64	\$326.1	\$2.47	\$307.4
BellSouth Corp.	\$3.03	\$382.3	\$2.93	\$408.5
Hydrex Corp.	\$3.01	\$322.8	\$2.64	\$310.8
Pacific Telesis Group	\$2.28	\$272.3	\$2.26	\$283.0
Southwestern Bell	\$1.89	\$248.8	\$2.01	\$279.2
US West, Inc.	\$2.11	\$268.8	\$2.05	\$270.2

Five of seven Bell operating companies posted an earnings decline for the quarter as compared with the same period last year.

LONG-DISTANCE COMPETITION

ALC niche market strategy pays off

Carrier profits in cutthroat industry.

BY PAM POWERS

Senior Editor

CHICAGO — Although a distant fourth in the rough-and-tumble world of long distance, ALC Communications Corp. has carved itself a lucrative market niche that has propelled the company to its third consecutive quarter of profitability.

ALC currently offers WATS- and Megacom-competitive services in addition to dial-one equal access, Message Toll Service and private lines. Its Maxcess family of products provides dedicated and switched access to virtually banded WATS lines and T-1 transmission for users with more than 10,000 lines.

On the heels of US Sprint Com-

munications Co.'s reported \$632 million second-quarter loss, ALC last week posted earnings of \$1.1 million on \$99.9 million in revenue for the second quarter of 1987. While revenue declined from \$120 million during the similar period in 1986, earnings were up from a loss of \$4.1 million in the second quarter of last year.

William Maloney, ALC's vice-president of marketing and sales, noted what he termed the "dramatic improvement in earnings" and attributed the decline in revenue to a 30% decrease in long-distance rates over the course of the year.

He remarked that call volumes remain steady for the company and he expects further rate reduction.

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INTERNATIONAL

Cable foes mull merger

BY JOSH GONZE

Staff Writer

TOKYO — One of two vendor groups trying to win entry into Japan's international telecommunications market last week proposed a plan to merge with its rival.

The international consortium led by Pacific Telesis Group and the UK's Cable & Wireless plc proposed joining with a consortium of Japanese companies led by Mitsubishi Corp. to build a transpacific fiber link. The two vendor teams have independently pursued permission from the Japanese government to compete with the nation's telecommunications monopoly but have been stymied by the government's insistence that the market cannot support two additional vendors.

The Cable & Wireless consortium rejected a previous merger proposal put forth by the Japanese government under which foreign companies would have been limited to a 3% share of the stakes. Cable & Wireless called that plan unacceptable, and Pacific Telesis had indicated that 3% was too small a share to keep it interested in participation.

Under the new proposal, the four largest members of each of the two consortia would share 72% of the equity in the merged company.

Cable & Wireless's proposal could put new pressure on the Japanese government, according to sources close to the dispute. Already under fire from President Reagan and UK Prime Minister Margaret Thatcher to open its telecommunications market to foreign competition, Japan could allow both consortia into the market in the end.

"If the unification talks don't work out, it's my understanding that our consortium would move to apply for a separate license, and there have been indications from

the government that it would consider two licenses," a Pacific Telesis spokeswoman said.

Currently, overseas telecommunications from Japan are handled through a single transpacific cable licensed to Japan's Kokusai Denhin Denwa Co. The company maintains the only existing undersea cable linking Japan to North America. □

VENDOR VIEW

MARK DAVIES

Thinking through NetView

IBM's recent network management announcements raise questions that suggest more is needed to meet users' needs. The NetView approach may not provide the kind of integrated, multivendor solution users are demanding. What, then, is the answer for users that require integrated network management for heterogeneous networks?

IBM's approach is part of the answer for a Systems Network Architecture net with a minimum number of non-IBM devices, since NetView provides the applications to manage the SNA host environment. With NetView/PC, which allows for a series of alarms from non-IBM devices to NetView, IBM can provide the rudiments of integrated end-to-end network management.

But what about the majority of networks today that entail a high level of complexity beyond the host environment? Users' concerns are to maintain the availability, flexibility and per-

formance of such networks.

Network management must encompass a multitude of network resources, including transmission devices, concentrators, switches and interfaces into data processing equipment — and, of course, the information being exchanged.

The network manager must be able to look at the network as a whole, not simply as data from the individual devices. Accomplishing this is dependent on achieving a high level of integration of management information throughout the network. Powerful tools are needed to enable an operator to manage faults and events in the network, to reconfigure the network as required and to optimize network performance.

Providing this high degree of integration and functionality — at an affordable price — is dependent on a well-designed architecture, standard network management interfaces and protocols as well as well-defined management functions.

IBM responded to users' needs for integration by adopting its own architecture for

multivendor network management and by providing vendors an interface through NetView/PC. While NetView/PC provides a uniform data transport facility between NetView and data communications equipment, it does little to unify network management functionality.

After hooking up several vendors' equipment to the host through the NetView/PC link, the systems still can't communicate until a NetView user application is written to integrate information from each vendor's equipment in the network. It is unlikely that this can be done cost-effectively for many of the world's communications components, given the large number of conversion programs that must be written to allow devices in the network to communicate.

Whether it is easier or even possible to control one vendor's equipment through NetView/PC rather than via a "native" interface to the same vendor's equipment is debatable. And NetView on the host offers no mechanism to control and manage multiple vendors' products.

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Davies is vice-president and general manager of wide-area network products, Codex Corp.

Thinking through NetView

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except by user-provided programs or unwieldy command lists.

After buying these de facto standard network management products, the user will have to make a substantial investment in software development to integrate NetView User Applications for the equipment purchased from the NetView-supporting vendors.

What is the solution? There is an independent view. NetView as seen through the eyes of the international standards bodies, such as Open Systems Interconnect, could also be an intelligent agent that reports to and executes commands

from an independent management system.

Based on an open architecture and standardized interfaces, an independent system would provide the level of integration and ease of use users are demanding. For networks with significant non-SNA data or those with a number of complex or costly transmission devices, such a system is critical.

International standards offer a ray of hope for users looking for integrated management of heterogeneous networks. NetView offers the potential for a common user interface to give the appearance of integration. In the longer term, industry-wide standards will be crucial in achieving truly integrated network management. □

ALC market strategy pays off

continued from page 7

tions this August to be offset by declining access costs.

ALC was formed in December 1985, when Allnet Communications Services, Inc. merged with Lexitel Corp., a WATS reseller. Since that time, the company has grown to a customer base of 700,000; 60% of this base is composed of commercial customers. ALC claims to have 1% to 2% of the total domestic long-distance market — two years ago, industry estimates placed ALC at less than 1%.

"The economics of the long-distance industry decree that you have to have market share to suc-

ceed," admitted Maloney. But, he said, "I would rather have a 10% share in one regional market than a 1% share in 10 regional markets."

He said ALC holds about 10% to 12% of the Midwest region, comprising Ohio, Illinois, Michigan and Missouri.

ALC's strategy

ALC's strategy, Maloney explained, is to target niche markets such as the small to mid-sized commercial customer in the Midwest. Although ALC's long-distance service will terminate calls anywhere in the U.S., Maloney said the company is more selective in providing service origination.

"That allows us to focus our marketing resources and tailor our services to specific markets," he said.

Maloney said ALC is prepared to announce a "panoply" of new services within the next six to nine months. Slated for introduction by the fall are operator services and international services. By the end of the year, ALC also intends to offer 800 services.

According to Bob Self, president of Market Dynamics, a consulting firm in New York, "ALC has had a strong rate of success since it started confining its marketing efforts to the Midwest region. It competes with the big three carriers on price, but it also offers services that are tailored to its target users. I think ALC is attractive because it provides better hand-holding than the big carriers."

ALC's regionalized approach to long distance may have other advantages. Unlike the major carriers, which are pouring vast amounts of money into building their own nationwide fiber-optic facilities, ALC leases transmission facilities from a variety of smaller carriers in low-traffic areas. Maloney said that in areas where most of ALC's traffic is concentrated, the company owns fiber or digital microwave networks.

"ALC is spared the heavy depreciation costs and the up-front capital requirements associated with building your own high-capacity nationwide network," Self said. "They are profitable because they don't have those expenses."

But Jeff Close, a senior consultant with the DMW Group, Inc. in Ann Arbor, Mich., disagreed, saying, "The only way ALC can survive is by somehow increasing its ownership of network capacity — it's the only economical way to provide transmission services in the long run."

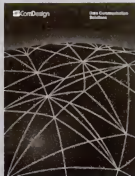
Close suggested that ALC will be acquired by another carrier, and Maloney acknowledged that possibility. "We could acquire, be acquired or merge with another long-distance company," he asserted. "There will be further consolidation in this industry, and ALC will act as a magnet for smaller companies looking to take advantage of the network economics. That's how we intend to grow." □

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TELECOM TRENDS

Slow growth seen for PBXs, key systems

Both the private branch exchange and key systems markets will show modest growth while revenues from these sales will slip over the next four years, according to a study released by Market Intelligence Research Co. of Palo Alto, Calif.

The report, "PBX and Key Systems Markets II: Identifying the Opportunities," predicts station shipments will increase from 8.9 million units in 1986 to 10 million in 1993. Because of fierce price competition, revenues from sales of these systems will slide until 1991, when revenues will again begin to make slight gains.

VOICE NETWORKS

Inland Steel opts for IIN service

Indiana Bell service beats out PBX net.

BY JOSH GONZE
Staff Writer

EAST CHICAGO, Ind. — After nearly two years of searching for a new voice switching system, Inland Steel Co. recently settled on a customized central office-based service that involves installation of a remote switch on the steel maker's plant site here.

Officials at Inland Steel say they expect the Indiana Bell-provided switching service, called Integrated Information Network (IIN), to

cost about \$1 million less per year than a private branch exchange because IIN uses existing plant wiring, while a PBX would have required new wiring at a high annual cost.

At the same time, IIN may equal or even outperform the proposed PBXs in terms of cost performance, reliability, service and voice features, according to Jim Reddel, telecommunications consultant for the steel maker.

"I think the bottom line is that we backed away from the integrat-

ed voice and data PBX concept, which I know is pushed by vendors, but I'm not so sure it is readily accepted by users," Reddel explained.

When the IIN is cut over early next year, Indiana Bell will provide Inland Steel with voice switching for Indiana Harbor Works, its 2,000-acre campus-type manufacturing site here, and three small sites maintained nearby for administrative and research functions. IIN is capable of switching data, but initially, Inland does not plan to use it for that purpose.

Inland Steel's arrangement demonstrates several ways IIN differs from conventional Centrex. Centrex is a generally tariffed service, meaning all users of a certain level of service pay the same price. IIN, in contrast, is individually tariffed, meaning the state public utility commission grants individual

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AT&T ACCUNET T1.5

M-44 mux option ups capacity

BY MICHAEL FAHEY
Senior Writer

WASHINGTON, D.C. — AT&T recently filed a tariff with the Federal Communications Commission seeking permission to offer a service that would enhance the data-carrying capabilities of its AccUNET T1.5 M-44 multiplexing option.

M-44, introduced in 1985, enables customers to squeeze 44 voice channels into a single T-1 line, as opposed to the 24 channels normally supported over T-1.

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CROSS TALK BOB WALLACE

NEC swims against the PBX tide

NEC America, Inc.'s recent decision to establish a direct sales group to sell its NEAX 2400 digital private branch exchange could spell trouble for the vendor, but save money for users.

Prior to the creation of its Business Communications Systems sales department, NEC sold the NEAX 2400 and add-on gear through several regional Bell holding companies and interconnects, the latter including Tel Plus Communications, Inc. and BellSouth Enterprises. The new group will sell NEC switches in California and Nevada.

NEC's move runs against industry PBX distribution trends. Last November, Northern Telecom, Inc. sold its western region sales and service arm to PacTel Information Systems. A month later, the switch maker sold the midwestern arm of its Integrated Office Systems to Centel Business Systems. Only its eastern direct sales force remains.

Siemens Information Systems, Inc. opted to purchase Tel Plus, one of the largest independent switch distributors, instead of assembling a direct sales force to accomplish the same task.

Industry analysts who scrutinize product delivery strategies expect PBX peddlers to continue to tweak their distribution systems. One analyst speculated that NEC may soon expand the group's geographic coverage beyond the two states it covers, California and Nevada. Ian Angus, president of the Toronto-based Angus Telemanagement Group, a consulting and research firm, said: "I suspect they are testing the waters by selling direct in two states."

The creation of the direct sales group could cause some "channel conflict" — a situation in which two or more organizations are selling the same product in the same geographical region or to the same group of users. In such situations, a user may receive request-for-proposal bids from several vendors for the same product.

When this happens, the vendors offering the same switch may try to undercut one another on price. They may also offer extra features that would make their bids more attractive than their competitors'. This means the vendor stands to reduce or eliminate its profit margin, while the user gets a

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U.S. public telecommunications market forecast

Market	(Billions of dollars)	1986	1987	1991	Compound annual growth rate 1987-1991
Transmission equipment		\$3.6	\$3.8	\$5.6	10.7%
Network switching equipment		3.7	3.6	3.0	(4.3%)
Public telecommunications services		138.1	153.4	221.5	9.9%
Cellular mobile radio		1.2	2.0	5.5	28.9%
Total public		\$146.6	\$162.6	\$235.8	10.0%
Total U.S. telecom		\$160.3	\$177.9	\$256.1	9.6%

SOURCE: DATAQUEST, INC., SAN JOSE, CALIF.

TELECOM TIDBITS

Metromedia Long Distance, a Metromedia, Inc. company, recently announced it will offer international calling to 140 countries. International service is available to all WATS and equal-access customers, the carrier said. The offering carries no sign-up charge or monthly fee. Customers pay usage charges for all calls made.

International calls made by users on this new service are applied to their total service usage. When the total service usage reaches a certain level, users can obtain price discounts. Subscribers to the carrier's Metromedia WATS and OneStep WATS services may place international calls over these lines.

DSP Technology Corp. of Carrollton, Texas, recently introduced two new versions of Confer, its six-party teleconference bridge. The Confer-M is programmed to operate as a call-in bridge. The unit can be used either with or without an attendant.

The Confer-E is an enhanced

version of the Confer. One added feature enables the user to choose what telephone line is used for the conference. Other parties can be added without dialing.

MTN Systems, Inc. of Lombard, Ill., and **Telesphere International, Inc.** of Oakbrook Terrace, Ill., have inked an agreement to provide a nationwide credit card and operator-handled long-distance service dubbed Percentage Plus.

The new service is geared to meet the needs of hotels, hospitals, universities and other businesses and institutions with telephone systems that are primarily used by third-party callers.

Under the three-year agreement, MTN Systems will install and maintain the customer premises equipment needed to link telephone systems to the Telesphere long-distance network. The carrier will provide the credit card collection function and operator-assisted services. Both companies will vend the service. **E**

M-44 mux option ups capacity

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M-44 voice channels also operate at 32K bit/sec, while standard T-1 links operate at 64K bit/sec. Four M-44 channels are reserved for signaling.

According to an AT&T spokesman, the compression technique used with M-44, Adaptive Differential Pulse Code Modulation, can have an adverse effect on data communications.

The Channel Control Option allows users to combine 12 32-bit/sec channels within M-44 into a higher speed 384K bit/sec channel, which can then be divided into any combination of 32K and 64K bit/sec

slots. For example, the spokesman said, a user could divide the entire 384K bit/sec capacity of the 12 channels into six 64 bit/sec slots.

AT&T has requested FCC permission to institute a one-time charge of \$51.75 for M-44 users who choose to subscribe to the Channel Control Option. Users who choose the Channel Control Option when they initially subscribe to the M-44 multiplexing option, however, will not pay the one-time charge. The M-44 multiplexing option costs \$517 per month.

AT&T last week also proposed a feature called One Number Calling for its ReadyLine service that will permit customers to use the same 800 number for both interstate and intrastate AT&T service. □

Inland Steel opts for IIN service

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case-based pricing schemes.

Most Centrex switching tasks are performed at the central office, and the use of customer premises equipment is minimal.

In contrast, IIN uses customer premises-based switching. IIN also enables the user to perform telephone station moves, adds and changes, but Centrex does not, according to Hope Cambridge, IIN delivery manager at Indiana Bell.

Under the contract, Indiana Bell will install a Northern Telecom, Inc. remote switch module called a large business remote (LBR) at the Inland Steel plant. Indiana Bell will also install a fiber link to the cen-

tral office's host switch for IIN, a Northern Telecom DMS-100. The LBR will handle all on-premises switching without involving the central office.

The LBR will send off-premises calls up the fiber link to the DMS host for switching. In addition, the LBR will upload call records such as station message detail recording data to the central office.

Inland Steel's sway toward IIN was largely due to the difficult wiring requirements associated with the installation of a new PBX. Inland's existing wiring, which was turned over to Indiana Bell at the time of divestiture, is set in a star topology to work with the Western Electric Co. step-by-step, electromechanical PBX currently handling switching duties at Inland. The distributed, multiline architecture of most modern PBXs requires a distributed wiring scheme.

Reddel estimated the cost of re-wiring the plant in a distributed scheme at \$4 million to \$5 million.

A centralized PBX could have utilized the existing wiring, but government regulations would have required the company to purchase the wiring from Indiana Bell, something Inland Steel's management did not want to do. "The existing wiring would have meant a lot of other problems with maintenance, upkeep and so forth," Reddel said. The IIN plan will allow use of the plant's existing wiring without requiring its purchase by Inland Steel.

Besides the wiring advantages, Reddel found the IIN more adaptable to changing voice demands than a PBX. "There's a lot of flexibility built into the IIN as far as being able to reduce some of our fixed costs. If we were to shrink or shut down some facilities, we can cancel some of that service with no penalty," he said.

Reddel calls IIN's voice features "very, very competitive with most PBXs out there."

Bell operating companies around the U.S. have been offering services such as IIN for about two years, with each BOC using its own trademarked name. Generally, the service is targeted at large users with sophisticated switching needs. □



"... Network World clearly stands head and shoulders above the competition. One big reason is its networking focus."

Dick Hichens is Senior Technical Network Analyst for ALLTEL Corporation of Hudson, Ohio. The thirteenth largest telephone utility in the United States, ALLTEL provides cellular phones, wide-area paging services, fiber optic-based phone equipment and more to customers in 19 states. Dick is involved in purchasing ALLTEL's network communications equipment.

He must make informed decisions, based on the latest and most accurate information available. That's why he relies on *Network World*.

"I initially subscribed to *Network World* because I needed to know what's going on in the communications community, both voice and data.

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"And it's a big part of my decision-making process. It works for me in two ways: articles give me detailed information on products and technologies, and advertisements provide a road map to vendors.

"I read other communications publications, but *Network World* clearly stands head and shoulders above the competition. One big reason is its networking focus. And I have many colleagues who'll tell you the same thing."

Every week, more than 65,000 purchase-involved subscribers like Dick Hichens look to *Network World* for information that can help them — and their companies — stay ahead. If you market communications/networking products and services, there's no better place to reach a powerful audience of buying decision makers. Call your local *Network World* sales office and reserve space for your ad today.

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NEC swims against PBX tide

continued from page 9

great deal.

Direct sales forces are also expensive to operate. Even so, a vendor pressed to boost its user base may choose the personal touch that comes with a direct sales representative.

Channel conflict is not always a losing proposition, even if it means reduced profit margins. If channel conflict leads to new customers, PBX makers still stand to make money by selling add-on features such as voice mail, automatic call distributors and extended maintenance contracts. □

DATA DELIVERY/ NET MANAGEMENT

Planning guide out

Communications Solutions, Inc., a San Jose, Calif.-based consulting and software firm, has published a 150-page report designed to help users develop a net management plan. "Implementing Network Management" provides information on a variety of net management products and gives users tips on evaluating competing offerings. The report costs \$395. For more information, call (408) 559-1118, ext. 536.

QUESTION & ANSWER

DEC exec offers insights into firm's future net plans

Outlines view on standards, multivendor net management.

Many observers claim Digital Equipment Corp.'s cohesive networking plan has triggered the company's recent successes in marketing and sales. But analysts and users are wondering if the company can maintain its technological and marketing momentum — especially in the face of an increasingly networking-oriented IBM.

At a DEC-sponsored consultant briefing in Glen Cove, N.Y., Network World staff writer, Josh Gonze talked to David Korf, wide-area and systems marketing manager at DEC. Korf outlined DEC's future networking plans vis-a-vis IBM and talked about the compa-

ny's views on network management, Open Systems Interconnect (OSI) standards and telecommunications issues.

When selecting a network management strategy, why should users go with DECnet's distributed approach, rather than IBM's centralized approach through NetView?

There are two reasons. If you have a centralized approach, you have a central point of failure. By having a distributed approach, you can put network management capabilities where they are needed throughout the network.

That does not mean that because

you are distributed, you cannot organize net management in a hierarchical fashion to meet your needs. But if you are in a hierarchical model, you cannot arbitrarily distribute network management functions.

So the distributed approach gives customers more flexibility.

Does DEC have a plan for multivendor network management?

Multivendor network management will occur in two specific areas. Digital today has great capabilities in network management. We plan to further enhance them as network management standards become finalized, specifically



David Korf around the OSI model. Secondly, in relation to IBM, obviously we have to be able to go out and communicate and allow the two types of equipment to talk, as well as manage each other. We will have to provide that type of capability.

See page 12

DATA DIALOGUE

MICHAEL LATRIANO

USER SURVEY

Big firms embracing DISOSS

But system's limits still concern users.

BY JOY KALFOPULOS

Network World Staff

BERKSHIRE, England — Large companies are slowly warming up to IBM's DISOSS, but the product's technical limitations are keeping it from widespread acceptance, according to a recent survey of users conducted by Xephon Technology Ltd.

In the report, "DISOSS in Practice," Xephon questioned 64 current DISOSS users in North America and Europe on why they purchased the product, whether it lived up to their expectations, how it performs and how it could be improved.

DISOSS, IBM's host-based office software, provides library and document distribution services as well as electronic mail capabilities for office workstation users. It is designed to support information sharing among IBM office systems on a variety of processors.

According to the report, users view DISOSS as IBM's strategic product in the office systems area. See page 12

Net management in a DEC world

This is the second of two columns studying Digital Equipment Corp.'s network management strategy and products ("Net management: SNA vs. DNA," NW, June 22).

Since network management skills are rare and expensive, many companies opt for centralized network management, an approach often associated with IBM's net management strategy.

But, by using DECnet Monitor, a DECnet user can also establish a central control point. The DECnet Monitor maintains a data base of network information that is presented to a user through displays and interactive graphics.

For example, if a point-to-point link fails, that failure will be recorded at each end of the circuit.

If there is more than one failure, the DECnet Monitor will automatically sort out duplicate indications, ignoring redundant information.

The Network Control Pro-

Latriano is a consultant in the Management Consulting Group at Price Waterhouse in New York.

gram (NCP) running on various DECnet computers keeps counters on traffic volume and error statistics.

It also computes message and error rates based on these statistics. Then the DECnet Monitor can detect increasing error rates and provide displays to highlight such trends for the net manager.

The DECnet Monitor system creates a model of the network through a data base that reflects the relationships of network components. Special monitor software does not have to reside in each node. The monitor can collect information about any node in the network. This approach differs from IBM's approach. IBM's Response Time Monitor software is needed in IBM remote devices, which supply statistics to NetView.

While products such as DECnet Monitor provide centralized control, DEC users such as Stanley Rose, vice-president at Bankers Trust Co. in New York, agree that DEC's primary net management product involves distributed control.

"One of the reasons you don't see equivalent response-time measuring tools in the DEC

world like those in the IBM world is that there are not as many response-time problems in a distributed network," Rose said. Bankers Trust has more than 75 DEC VAXes and 350 terminal servers but rarely exceeds 15% utilization on any given Ethernet.

"DEC networks are easy to manage," Rose added, "but they are weak in security, especially authentication."

DEC has not yet created an umbrella product like NetView to integrate its various network management products. Instead, the company supports a series of net management products.

Brief descriptions of each follow.

■ VAX Ethernet is an Ethernet maintenance program that runs under Phase IV DECnet software on a system configured as a full-function DECnet node. Ethernet builds a data base containing information about each node directly connected to the Ethernet cable.

The product can also test Ethernet connections to all nodes on the network — excluding MicroVAX I and VAXstation I — and to Digital Network Architecture network

See page 12

DEC exec offers insights to plans

continued from page 11

What is your view of IBM's LU 6.2? Is it a de facto standard, and does DEC plan to increase its own LU 6.2 capabilities?

LU 6.2 is not a de facto standard. It's commonly used to mean LU 6.2. [Advanced Peer-to-Peer Networking, APPC and all the other alphabet soup.]

The very first implementation of DECnet had task-to-task computing, which is the program-to-program computing that IBM now calls LU 6.2, APPN, APPC. There's been a lot of buzz about it.

IBM, because it was more concerned with connecting terminals together rather than computers, chose a hierarchical networking structure. From the beginning, Digital was concerned about connecting computers together.

One of the reasons you hear so much about LU 6.2 is that it's something new for IBM. It is not new for Digital. Digital has been doing it for 12 years. It's not rocket science, folks.

Do you plan to provide PU 2.1 support in your products?

At this point, PU 2.1 is tied, from IBM's viewpoint, with APPN and APPC. From our viewpoint,

the DECnet SNA gateway is a PU 2 device supporting Logical Units 0, 1, 2, 3 and 6.2. There is no commitment to do a 2.1 interface.

Can customers wait for the OSI model to evolve, or are they currently asking for multivendor network management?

Customers are asking for it today, and in various areas, Digital is already providing that capability. By using Digital's distributed network management, a customer can manage extremely large networks.

Is DEC under pressure from customers to integrate voice and data?

Several customers have expressed a desire to perform that function, so there is pressure for us to find ways to merge those functions. We don't see a lot of demand from customers for us to put voice and data on the same wire.

Digital believes the functional integration of voice and data will occur first, before the actual physical integration of voice and data will occur in a local-area network.

This approach does not prevent a customer with a wide-area network from multiplexing, for example, voice and data streams as they come out of a local-area network or as they come out of the customer's PBX.

Does DEC have plans for an alliance with a T-1 vendor, such as IBM and Network Equipment Technologies, Inc. have done?

At this time, we have no plans for an alliance. You can treat a T-1 line as nothing more than a bunch of 64 KB channels, and those 64 channels could be coming from anywhere.

Some could be coming from a telephone circuit, and others could be coming from a Digital VAX. And you could multiplex them over the same physical wire. That's not rocket science. People do that all the time.

Are there plans to add PBXs to DEC's product line?

There are no plans to add PBXs to the Digital product line. If you align yourself with a particular PBX maker, you tie yourself into that one manufacturer and don't offer your customers an opportunity for choice. You essentially become viewed as competitor in a lot of cases. If you look at Digital's DEConnect strategy today, it provides a user with the opportunity to choose the PBX vendor of his choice.

Will DECnet evolve at the higher levels of OSI?

Yes, DECnet will adhere to the OSI protocol stack. There are real-

ly three steps in that process.

The first step is obviously proprietary — DECnet itself. Second is building on the lower levels, which are solid, and providing OSI compatibility in a coexistence-type mode. The third step is real integration between DECnet and OSI, so DECnet will be able to communicate with an OSI environment; OSI meaning multivendor.

That does not mean we'll throw all of DECnet away. We'll continue to enhance and build upon what already exists. But it will evolve to the multivendor OSI standards.

Can you explain DEC's S model for network design?

An S has several layers to it. If you start at the bottom of the S, you have different types of work groups, where you have individuals working for a specific goal. Those, in turn, if you move up to the middle part of the S, have what is known as the department-type computing, where departments then communicate and share information.

Up at the top, you have the corporate structure, where the corporate mainframe and the corporate hierarchy fits. Digital's architectures cover everything from desktop through department, site, region, to the top of the corporation and back down.

Net management in a DEC world

continued from page 11

application and user layers for any node running DECnet Phase IV on the Ethernet.

Ethernium runs as a layered product on the VAX/VMS operating system and can be operated from local terminals using Regis graphics for representations of the network under test.

■ Remote System Manager (RSM) is another VMS-layered software product that allows a network manager to perform software distribution, installation, backup and update tasks for DECnet Ethernet nodes.

The relationship of the RSM to the various distributed application nodes of a server to its clients.

The server provides services to clients that have been defined in the server's data base and are connected to the same Ethernet.

■ Remote Bridge Management Software (RBMS) is used with the LAN Bridge 100. As local networks grow, they often are connected to other local networks, and the management of local net bridges becomes critical.

RBMS can disable selected bridges or block traffic to isolate out of traffic on a specific segment of an extended network.

DEC uses a subset of the IEEE 802.1 Management Protocol to communicate between the VAX host and the targeted bridge, but RBMS provides more functionality and can actually control the LAN Bridge 100.

■ The LAN Traffic Monitor (LTM) captures information on traffic

from a bridged network.

A LAN Bridge 100, downline-loaded with the monitoring software, is attached to the Ethernet cable and transmits information to the LTM host software program located on any VAX in the extended local-area net.

The LTM collects statistics on all Ethernet traffic, regardless of which higher level protocol is used. Customers using DECnet, Transmission Control Protocol/Internet Protocol or Xerox Network System can study higher level network protocol performance as well. LTM also provides real-time and historical network performance graphs for various Ethernet segments.

■ Just as RSM manages the data base and print server/client relationships, another DEC product called Terminal Server Manager (TSM) manages terminal servers and associated devices.

Operating procedures are provided to centrally display and change terminal server parameters, reducing the need for technical personnel at remote locations.

■ DEC recently introduced its PBX/Facilities Management System (P/FM) and Cable/Facilities Management System (C/FM) to address the need for voice network management.

Currently, the products support AT&T's Dimension and System 85 private branch exchanges as well as Northern Telecom, Inc.'s SL-1s.

P/FM software tracks line costs and produces bills for PBX usage based on call detail recording output from the PBXs. The software can produce invoices as well as building services and equipment chargebacks.

C/FM is VAX/VMS software that manages voice and data cabling, PBX capacity planning and work order functions. C/FM includes cable management, station software features, PBX common equipment, inventory and work order entry modules.

Even with the latest additions, DEC still lacks network management for T-1 links and modems. Like any alternative, a decision regarding network management architecture depends upon a customer's existing requirements. For a user with a local-area network and no need to connect to a mainframe, DEC provides superior management tools.

IBM and DEC both have focused on the operational day-to-day aspects of network management more than long-range planning tools. DEC will need to provide network capacity planning and distributed network design tools to allow users to design the optimal network to support long-term business objectives.

Once an optimal network is designed, the network management tools discussed here can help to maintain optimal performance. Artificial intelligence software can create another area of enhancement for the existing DEC and IBM products.

Recent conversations with DEC officials indicate the company will announce several new network management products at this year's DECWorld show in September.

DEC will probably attempt to leverage its artificial intelligence experience and add those techniques to its network management products.

Big firms embrace DISOSS

continued from page 11

na, rather than IBM's Professional Office System (PROFS). Analysts have speculated that one of the products would eventually have to be discontinued, but a majority of the users queried said they consider the debate over DISOSS and PROFS irrelevant.

The two most important factors for choosing DISOSS, according to the survey, were the product's ability to work with other systems and the fact that it is a key component of IBM's office systems strategy.

Respondents said DISOSS's performance has been less than satisfactory, and in two cases, performance was so poor, the product was actually removed. Most users said they think DISOSS's technical limitations are holding back wider implementation of the product. Users also said IBM is moving too slowly in enhancing DISOSS's capabilities.

Users complained that they do not have enough technical support personnel with the know-how to maintain the system. But they said they believe IBM will eventually improve DISOSS's performance, thereby reducing support requirements.

The findings suggest the greatest strain is put on the DISOSS support function during the second year of using the product because, during this period, the system usage and user training needs are most likely to be necessary.

"DISOSS in Practice" is available for \$45 from Xephon, P.O. Box 4480, Winter Park, Fla. 32793.

LOCAL NETWORKING

INTERVIEW

Microsoft's Maritz on LAN Manager

Says product's success linked to OS/2.

Having created standards in the local networking arena with MS-Networks, Microsoft Corp. believes it can duplicate its success with its second-generation networking product, LAN Manager. Network World's West Coast Correspondent Mary Petrosky recently talked with Microsoft's Paul Maritz about the LAN Manager's capabilities and potential impact on the local networking market. Maritz is general manager of Microsoft's Networking and Xenix Business Unit.

Will you describe the characteristics and functions of the LAN Manager?

The LAN Manager is really an extension of [Operating System/2] that takes the inherent services of OS/2 and makes them operate across a network. In OS/2, you can open a file resident to your local disk. If you specify a different path name, it's the LAN Manager that's responsible for intercepting that call and accessing the information remotely.

Similarly, in OS/2, you can have multiple programs running at once, and those programs can communicate with each other. Two remote programs can exchange information, and again, it's the LAN Manager that allows those programs to communicate over the network.

You want to provide those services so they operate in the same way as when you're using them on your local machine. A person developing an application should not have to do anything different if he wants that application to run in a networked environment. We think that's important because in networking technologies today, you typically have this very rigid split between the server and the workstation. People have written their own proprietary software for the server. Novell, [Inc.] has NetWare, 3Com [Corp.] has 3+ and Banyan [Systems, Inc.] has VINES.

That's OK when all you want to do is store files on the server. But we believe people increasingly want to run applications on the server as well. That means you have to have a full application interface on the server. And if you're going to have an application interface, it makes life a lot simpler for everyone if that application interface is exactly the same interface

as is on the workstation, so people don't have to develop two versions of the software.

In addition to taking these basic interfaces of OS/2 and making them work across the network, the LAN Manager provides those functions that are unique to the network, such as the administration of the network itself, configuration, deciding who can have access to which resources and allowing the network administrator to set up permissions and alert conditions.

The LAN Manager has something called "named pipes." What is that?

It's interprocess communications. In OS/2, there is this facility called pipes. It allows you to figuratively put a pipe between two programs; they can exchange information by yelling messages down the pipe. Named pipes is where that pipe now extends across the network to a remote application.

In the local case, both programs are running as clients of a common operating system, which can establish the connection between the two processes. When processes are running remotely, you've now got two distinct operating systems involved, and the way they establish the connection is by giving a name to the connection, hence, named pipes.

Does the underlying server operating system matter in terms of the applications you want to run?

It matters very much because application developers don't want to maintain two versions of their application: one for the workstation and one for the server.

Will Novell and other companies not using the LAN Manager be able to run applications on their servers?

It's hard for me to see how they can do that without taking out an OS/2 technology license.

IBM has not made a commitment to the LAN Manager. What chance does the LAN Manager have of becoming a standard if IBM decides not to use it?

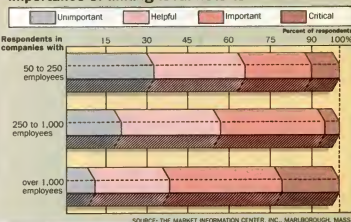
Ninety percent of the LAN Manager's chance for becoming a stan-

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“When IBM's Token-Ring adapter was released, there was a lot of speculation about the demise of Novell and 3Com. Instead, we had more business opportunities. When MS-Net was announced, there was a similar cry, and again there were more opportunities. The same thing will happen with the LAN Manager. It's not going to overtake Novell in name or technology.”

Craig Burton
Vice-president of corporate marketing and development
Novell, Inc.

Local net users in large organizations rate importance of linking local nets to wide-area nets



LANMARKS PAULA MUSICH

Vendors anticipate Mac-to-IBM PC demands

Integration of Apple Computer, Inc. Macintoshes into IBM Personal Computer environments may be the next big trend in local networking. It seems that for the past two years, a growing number of users have been sneaking Macintoshes in the back door of large organizations — not unlike the way personal computer users brought the new machines into their offices during the early '80s.

Although MIS managers have tried to standardize on IBM Personal Computers and compatibles, many of the Macintosh users are going around MIS because of the advantages provided by the Macintosh/LaserWriter combination for desktop publishing applications. Others have found the graphics capabilities indispensable for computer-aided design and manufacturing applications, and still others just liked the machine's graphic user interface.

However, users do not live by graphics alone, and much of the information desired by Macintosh users exists in the dominant IBM world.

This information, coupled with the greater functionality provided by IBM-oriented personal computer networks, is driving the demand for better links between the Macintosh and IBM Personal Computer

realms.

Existing links, according to some Macintosh users, are backward: They attempt to bring the IBM Personal Computer into the Macintosh world, rather than bring the Macintosh into the MS-DOS world.

In anticipation of demand for Macintosh-to-personal computer links, major independent networking vendors such as 3Com Corp., Novell, Inc. and Banyan Systems, Inc. are researching or have begun work on links to the Macintosh for their networking software.

3Com started shipping its 3+ for Macintosh at the end of July, and Novell is expected to provide NetWare support for Macintoshes by the end of the year. Banyan announced initial support for Centram Systems West, Inc.'s Transcendental Operating System networking software and is likely to provide tighter integration in its Virtual Networking System networking software in the near future.

Should these links provide the integration users are looking for, they will undoubtedly succeed, creating their own special — not to mention sizable — niche in the market.

Perhaps someday they might even drive MIS managers into sanctioning a dual Apple and IBM microcomputer standard. □

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Sept. 14	Sept. 2	Data General
Sept. 28	Sept. 16	IBM
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NETWORK WORLD

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COMMUNICATIONS MANAGER

► MANAGEMENT PROFILE

Telecom exec is ready for future

Weyerhaeuser's Susan Mersereau puts her faith in careful planning.

TACOMA, Wash. — For Susan Mersereau, belief in the value of long-range planning and a willingness to take risks have been the key factors in a successful transition from public school administrator to director of a private, nationwide telecommunications network.

Mersereau, who once headed the planning, research and management information systems operations for the Seattle School Department, also brings an end user's perspective to her job as telecommunications director for Weyerhaeuser Information Systems.

"Careful planning is very important in telecommunications," said Mersereau, who joined Weyerhaeuser Co. as an information systems program manager in 1980 to help chart its long-range communications plans. "You have to know where you are going. But you don't want to become locked into one way of getting there because things are changing so quickly."

Weyerhaeuser Information



Susan Mersereau Systems (WIS) is a separate business providing communications, data processing and other information systems services for the parent company's lumber, paper and real estate operations. Furthermore, WIS is now a profit center for Weyerhaeuser. It is marketing its services to outside organizations and now has six

customers in addition to the Weyerhaeuser divisions.

When Mersereau joined Weyerhaeuser, she helped develop a long-range strategic plan for the organization's information systems and communications operations. When, as a result of that plan, WIS was established as a separate division in 1985, Mersereau became head of telecommunications.

WIS, which had previously operated as a support group within the Weyerhaeuser Co., now has a separate budget and is expected to operate at a profit.

The eight-node WIS voice telecommunications network, which currently serves some 180 locations, is a hybrid of leased lines and virtual network services provided by both AT&T and US Sprint Communications Co.

The decision to move away from sole reliance on private lines and to incorporate virtual network services into its telecommunications scheme was influenced by forecasts of a continued rise in private-line rates.

The company also believed virtual networking services would offer more flexibility in meeting Weyerhaeuser's diverse communications needs, Mersereau said.

"We have many low-volume areas that are not located in major urban areas," Mersereau said. "We knew we would be hit very hard by increases in pri-

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"There are no textbook solutions to telecommunications problems. Telecommunications managers must take risks if they are going to position their companies for the future.

Susan Mersereau
Director of telecommunications
Weyerhaeuser Information Systems
Tacoma, Wash.

DIALOGUE

Do you have someone in your organization who follows regulatory trends and tracks tariffs?

66 No, we don't have one person who just follows those issues. We all follow them to a certain extent, and I also rely on my vendors to tell me what's going on.

Rick Manser
Telecommunications manager
Gillette Co.
Boston

66 Essentially, that's part of my responsibility in long-range planning for our worldwide telecommunications network. We have a large legal department here, and they circulate briefs from the Federal Communications Commission to keep us up to date. I also read trade publications, newspapers and magazines, and rely on professional organizations such as the International Communications Association.

Virgil Palmer
Corporate telecommunications planning manager
Air Products and Chemicals, Inc.
Allentown, Pa.

66 We don't have someone specifically, but we all try to keep track of what's going on by reading the trade publications and keeping up on news. We also have a national account team with AT&T that helps keep us current. We're too small a staff to have someone specialize in that.

John W. Robinson
Information services manager
Goodyear Tire and Rubber Co.
Akron, Ohio

66 Generally, I follow regulatory trends and tariffs — I don't have anyone on staff following them. I belong to the ICA, and they provide me with all that information.

Kathleen Holm
Telecommunications manager
Wilson Sporting Goods Co.
A subsidiary of PepsiCo, Inc.
River Grove, Ill.

66 No, we don't have anyone here who follows regulatory trends or tariffs and, as far as I know, we don't keep up on them. It's not a major problem in our group. It's probably more of a problem for the corporation than for us.

Wayne Shirley
Manager of systems
Monsanto Co.
Greenwood, S.C.

66 We keep up with them to some extent, but most of what we do in that regard is controlled through the [state] Office of Telecommunications. Anytime we have to order something, we go through that office. I try to keep up with what's going on, and any questions I have are directed to the telecommunications office, where the trends and tariffs are closely watched.

Jesse Kirby
Communications manager
Louisiana Health/Human Resources Department
Baton Rouge, La.

GUIDELINES

ERIC SCHMALL

Battling for budget bounties

Among the many aspects of the planning process, none is as sobering as budget preparation. Translating future action into hard dollars reveals the more difficult truths of communications management.

The process reminds managers of fiscal limits, and at the same time, calls attention to upcoming service and hardware needs. While it can be frustrating and humbling, the annual scramble for funding certainly serves to sharpen communications managers' perspectives on what they will be able to accomplish in the upcoming year.

A budget is necessary because resources are limited, and communications managers must learn to compete with other executives and managers for a proper share of those resources.

One means of lobbying for adequate funding is to relate the communications budget to

communications' potential benefits for the organization as a whole.

So, while the communications manager may need a certain amount of money "just to keep the lights on," some to make the operation more efficient and still more to purchase new equipment and services, all of these needs must be presented to upper management in a broader context. Showing how the new network configuration or private branch exchange enhancements will help end users and, more importantly, how they will improve the organization's bottom line, are the secret to loosening corporate purse strings.

Then, of course, it is up to communications managers to deliver on their promises. The budget commitment is a solemn one, and promises to boost the bottom line in return for more generous funding will be remembered. The communications managers who succeed, however, will gain new respect from management, and in the future, their budget requests will be more readily met. □

Schmall is network systems manager for an insurance holding company.

Hot topics coming your way this summer in Network World.

August 17: HYBRIDS/LOW-END PBXs

Low-end PBXs offer greater functionality than do key systems, but when is it wiser to opt for a money-saving hybrid key system/PBX with fewer capabilities? This Product Focus helps users decide.

August 24: NETWORK SECURITY

Protecting sensitive information from unseen enemies both inside and outside the organization is no easy task. This Special Section works to sort it all out for *Network World's* 65,000+ subscribers.

August 31: NETWORK DESIGN AND OPTIMIZATION SERVICES

How well are vendors delivering on their promise of one-stop shopping for turnkey networks? *Network World* readers get some important answers from this Service Focus.

September 7: IBM SPECIAL

IBM's open architecture strategy may be a boon to users and software vendors only if they are willing to play "follow the leader" with Big Blue. Readers will get the facts from this Special Section.

September 14: PACKET SWITCHES

Packet switching can be a sensible, money-saving technology for many data network professionals. And this Product Focus gives users the full story.

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NETWORK WORLD

An IDG Communications Publication

ASSOCIATIONS

The United States Telephone Association will hold its 90th annual convention Oct. 13-15 at the Marriott World Center in Orlando, Fla.

Dennis Patrick, chairman of the Federal Communications Commission, will be one of the featured speakers.

Other speakers will include Jack MacAllister, chairman of US West, Inc.; Bob Boaldin, president of Elkart Telephone Co.; Tim Fisher and Bruce Hagen, both of the FCC; Gary Ames of US West; and Carl Bailey, president of South Central Telephone Co.

The Communications Managers Association will hold a meeting Sept. 10 at the Marriott Marquis in New York.

Lee Selwyn of Economics & Technology, Inc. will present a session on regulatory issues. John Malone, president of Eastern Management Group, Parsippany, N.J., will give a presentation entitled, "Evolution/Revolution in the Telecom-

munications Industry: 1987-1992."

The Southeastern Telecommunications Association (SETA) will hold its annual conference Nov. 15-18 at the Marriott Buena Vista Hotel in Orlando, Fla.

This year's keynote speaker will be Ellen Hancock, president of IBM's communication products division. The conference will feature exhibitions and tutorials.

SETA has announced a renewed effort to add state chapters in Kentucky, Louisiana and West Virginia. Also under consideration is a chapter in Washington, D.C.

Professionals in Telecommunications (ProTel) recently announced the results of this year's elections. Mike Elssesser was elected vice-president; Becky Moll, treasurer; and Amy Bensman, director of programming.

ProTel will hold a meeting in August that will feature a panel discussion on voice and data communications. ☐

Telecom exec is ready for future

continued from page 15

vate-line access charges if we continued with a strictly private-line network."

The decision to use AT&T's Software-Defined Network and US Sprint's Virtual Private Network services was designed to keep WIS from being dependent on one vendor and also to allow the company to test the competing services. Both vendors carry about equal amounts of WIS' long-distance traffic. The division handles about 60% of all Weyerhaeuser long-haul traffic.

Current plans call for WIS to continue with both vendors' virtual networking services. According to Mersereau, the services provided by the two vendors reflect their overall positions in the industry. US Sprint, she said, is more flexible and aggressive in its pricing. AT&T's years of experience and strong management of its plans. Mersereau said WIS provides its users with the ability to access the network without any awareness of whether their traffic is being carried on a private line or on one of the virtual network offerings. In fact, she said, many long-distance calls are completed using all of the organization's voice facilities.

WIS abandoned an early integrated voice and data strategy in 1984 and now supports three data communications networks, Mersereau said. One network is based on IBM's Systems Network Architecture. WIS also maintains a private packet network using equipment from Bolt, Beranek & Newman, Inc., and uses public packet services provided by Tymnet/McDonnell Douglas Network Systems Co. The SNA and private packet-switched networks bridge to the public Tymnet network.

The WIS data networks carry

about 40% of the total Weyerhaeuser data communications traffic, and that figure is expected to rise soon to about 65% of the total Weyerhaeuser data communications transmission, Mersereau said.

Mersereau, who holds a master's degree in history and teaching from the University of Chicago, began using computers and data processing as tools in educational research and planning. "I've always viewed computers and data processing as a means to achieve an end," she said. "Technology is not important for its own sake. What is important is understanding how to apply the technology."

In keeping with this philosophy, Mersereau said, she and her staff meet frequently with Weyerhaeuser's end users to discern their communications needs. "The businesses themselves play the most important role in developing strategic communications applications," Mersereau said. "They have the best understanding of their own needs and the communications support they need to be competitive."

Mersereau and her 90-person staff are responsible for about 93 private branch exchanges and more than 80 key systems. Rolm Corp. Computerized Branch Exchanges are used to switch voice traffic at seven of the network nodes. At the company's Tacoma headquarters, an AT&T 5ESS switch operated and maintained by Pacific Northwest Bell serves as the network node.

In 1988, WIS will embark on a new five-year plan designed to provide integrated digital voice and data traffic on the Weyerhaeuser network. Mersereau said her organization has been closely following the development of Integrated Services Digital Network, and the five-year plan is designed to incorporate that technology into WIS' communications strategy. ☐

NEW PRODUCTS AND SERVICES

► PROTOCOL CONVERTERS

PCI gives file transfer ability to ASCII terminals

BY JIM BROWN
New Products Editor

CALABASAS, Calif. — Protocol Computers, Inc. (PCI) recently enhanced its SmartNet 5250/T protocol converter to enable ASCII terminal users to transfer files with an IBM System/36 or System/38 minicomputer.

SmartNet 5250/T provides ASCII-to-EBCDIC conversion enabling up to seven ASCII terminals to appear to an IBM System/34, System/36 or System/38 as if they were IBM 5291, 5292 Model 1 or 3180 Model 2 terminals. The new version, SmartNet 5250/T Plus, now enables ASCII terminals to access PC support 36 or PC Support 38 software and transfer files with the minicomputer. The stand-alone unit links the seven ASCII terminals to the host via a twinaxial cable connection up to 5,000 ft long. Terminals link to the unit via RS-232-C or RS-422-A interfaces.

SmartNet 5250/T Plus will also support up to seven custom terminal types. Initial versions supported ASCII to EBCDIC conversions for a predefined set of 26 terminal types. The new User Definable Display feature enables users to define a set of seven additional terminal types.

Included among the predefined set of terminals are IBM's 3161, 3162, 3163 and 3164, as well as Digital Equipment Corp.'s VT-100, VT-1-2 and VT-220. Also in the predefined set are C. Itoh Electronics, Inc.'s 7103, Applied Digital Data Systems, Inc.'s Viewpoint and Viewpoint 60+, and terminals from TeleVideo Systems, Inc. and Wyse Technology.

When configuring a unit, users define the type of terminal that will enter the SmartNet 5250/T Plus from menu-driven software residing in the protocol converter. That software is accessible from any of the unit's seven ports.

Another new feature enables users to direct IBM 5219 system print jobs to a Hewlett-Packard Co. LaserJet Series II printer. In addition to supporting the HP LaserJet Series II, the SmartNet 5250/T Plus will make an ASCII printer appear to the host as an IBM 5256, 5219 or 3812 system printer. The unit supports as many as 20 different ASCII printer types, including the IBM Proprinter XL, Quietwriter 2, Wheelprinter and 3812 Pageprinter. The unit supports up to four user-definable printer types.

The product supports ASCII terminal speeds of 19.2K bit/sec and a host-link speed of 1.2M bit/sec. It will maintain configuration data in nonvolatile memory. The unit comes with 512K bytes of random-access memory and a dual microprocessor architecture, in which one processor processes data received from the ASCII terminals and the other processes data from the host.

Any attached terminal user can initiate the unit's basic assurance tests, which test the unit's processors, memory and all I/O circuitry. Faults are displayed via front-panel visual indicators. The unit will also compile statistics on the use of the twinaxial port or any of the seven terminal ports.

The 5250/T Plus is priced at \$2,595.

PCI, a subsidiary of Telematics International, Inc., is located at 26630 Agoura Road, Calabasas, Calif. 91302, or call (818) 880-4900. □

► NET MANAGEMENT

Data Switch unwraps network control tool

BY JIM BROWN
New Products Editor

SHELTON, Conn. — Data Switch Corp. recently introduced a network control system that enables users to monitor, configure and control a network of its DSM data switches.

ControlNet 250 enables central site network control personnel to manage up to 32 local or remote DSMs, which were sold by T-Bar, Inc. until its merger with Data Switch. ControlNet 250 supports up to 37 ports, dubbed gateways.

Currently, the DSM switches are controlled from a personal computer with Data Switch's ControlNet 200 software. That package enables the personal computer and one terminal attached to it to monitor and control DSMs. ControlNet 250 will enable as many as 10 to 15 terminals to perform switch management functions from local or remote locations.

A DSM switch control port links to a ControlNet 250 port. Up to eight switches can be strung together and connected to a single ControlNet RS-422 port, using the product's multipoint option. Other gateway ports support connection of ASCII control terminals and printers to ControlNet 250.

ControlNet 250 includes an Intel Corp. 80386 microprocessor with 2M bytes of random-access memory. It also comes with a 40M-byte hard disk that stores switch

configuration information, switch user profiles, port usage, alarm conditions and performance data. Also included with the unit is a 360K-byte floppy disk drive and a 60M-byte streaming tape cartridge drive. The unit is operated with internal menu-driven software and provides multiple levels of password security.

The unit will be the basis for other switch network-control products, according to Michael Ushka, vice-president of marketing. Data Switch will create new boards and software that will enable the ControlNet 250 unit to perform functions of the currently available ControlNet 100 and ControlNet 200. ControlNet 100 controls T-Bar's 3232 and Data Switch's 1200 channel-to-channel switches. ControlNet 200 controls T-Bar's DSM or Data Switch's Xy-Max data switches.

Currently, Data Switch also offers the MasterNet 300 system, which collates performance and monitoring data from existing T-Bar and Data Switch equipment. ControlNet 250, said Ushka, will eventually replace the current MasterNet 300 system, doing away with the need for separate systems to feed MasterNet 300.

ControlNet 250 ranges from a five-port model selling for \$10,000 to a 37-port model selling for \$42,000.

Data Switch can be reached at One Enterprise Drive, Shelton, Conn. 06484, or call (203) 926-1801. □

► WORKSTATION NETWORKING

Unisys debuts new BTOS Telephone-type wiring plan is also introduced.

BY MARY PETROSKY
West Coast Correspondent

SANTA CLARA, Calif. — Against the backdrop of a mountaintop winery here, Unisys Corp. recently unveiled a new, communications-rich version of its proprietary BTOS operating system and a telephone wiring-type networking scheme.

The new products were introduced as part of Unisys' workstation strategy, which calls for support of both proprietary systems and those based on industry standards, according to James Unruh, executive vice-president of Unisys.

The company's workstation line includes MS-DOS-based personal computers,

multiuser systems running BTOS and UNIX-based micro- and minicomputers, Unruh said.

Protected mode access

The newest version of BTOS, BTOS II 1.0, provides access to the so-called protected mode of Intel Corp.'s 80286 and 80386 microprocessors. The protected mode isolates operating system software from applications software and isolates tasks from each other. Unruh and other Unisys managers claim BTOS is the first operating system to tap the power of the protected mode in a multiuser system and break the 1M byte memory barrier.

Microsoft Corp. has stated it will provide similar

capabilities in its Operating System/2, due out in the first quarter of 1988.

Faster communications

BTOS II 1.0, due to ship in September, will allow applications to access up to 4M bytes of memory. In addition, the new release of the operating system supports faster, more efficient communications, according to Joseph Tucci, president of Unisys' Public Sector Systems Division.

BTOS is a multiuser, multitasking operating system that provides network support and uses a High Level Data Link Control-based communications protocol, according to Joseph Brown, program manager

See page 19

First Look

Intel releases new Ethernet controller board

Intel Corp. introduced a new version of its intelligent Ethernet local-area network controller board for the personal computer-bus architecture.

Based on its 80186 microprocessor and its 82586 local-area network communications controller, Intel's PC Link2 comes with 16K bytes of erasable programmable read-only memory and 256K bytes of dynamic random-access memory.

Also provided are Intel's iNA

960 transport and network software and Microsoft Corp.'s MS-NET networking software.

According to Intel, the board and software comply with the seven-layer International Standard Organization's Open Systems Interconnect reference model.

The board also features diagnostic firmware. PCLink2 software and hardware supports the iRMX, VAX/VMS and Xenix operating environments.

The PCLink2 board, software and documentation has an end-user list price of \$650. Quantity discounts are available. The board and software are available immediately.

Intel Corp., Literature Department W381, P.O. Box 58065, Santa

Clara, Calif. 95052, or call (800) 548-4725.

Device tests coaxial cable, twisted-pair links

Network Devices, Inc. unveiled a testing device that can detect problems in both coaxial cable and twisted-pair wire links.

Used with IBM category A terminals and controllers, the Link-Tester can verify twisted-pair cable and balun units for conductivity, connectivity, excessive signal distortion and noise. The product is also capable of working with coaxial cable. A Link-Tester handheld transmitter attaches to the coaxial cable or twisted-pair wire

lead from a terminal or controller and sends Manchester encoded signals at 2.359M bit/sec to a receiver. The hand-held receiver includes an error counter that displays the number of parity errors being received.

An attenuation control within the receiver indicates the signal strength of the connection being tested.

The Link-Tester costs \$2,000.

Network Devices, Inc., 8-11 San Sebastian Way, Sandwich, Mass. 02563, or call (617) 888-5200.

T-3 modem works with digital radio

Microwave Networks, Inc. introduced a T-3 modem that works with a Micronet 23 Digital Radio to provide up to 28 T-1 lines or 672 64K bit/sec pulse code modulated voice channels.

Designed for use with central office switches, the 45M bit/sec DS3 modem meets Consultative Committee on International Telephony and Telegraphy jitter specifications for T-3 transmissions. It is said to offer a wider bandwidth to local exchange carriers, interexchange carriers and large telecommunications system end users in business and government.

The modem also complements the company's current DS1 and Four DS1 interfaces, providing an upgrade path for customers.

The new modem, which is available in nonprotected or protected configurations — the latter having a hot standby spare in the same enclosure — provides first- or last-mile network options.

The average cost of the nonprotected Micronet DS3 modem is less than \$20,000.

Microwave Networks, Inc., 10795 Rockley Road, Houston, Texas 77099, or call (713) 495-7123.

Package converts PC spreadsheets for DEC VAX

Digital Equipment Corp. released enhanced software enabling personal computer-based spreadsheet files to be converted for use in DEC's VAX-resident VAX DECALC Version 3.0 and VAX DECALC-Plus Version 3.0 spreadsheet software.

VAX Xway Version 1.1 runs under the VMS operating system and translates spreadsheet models and data from personal computer software to VAX software. The package supports Lotus Development Corp.'s 1-2-3 and Symphony spreadsheet programs. In addition to earlier versions of those spreadsheets, VAX Xway supports Microsoft Corp.'s Multinomial Symbolic Link File, Software Arts, Inc.'s Data Interchange Format, ASCII tabular data, and ASCII field-described data.

VAX Xway software runs on all VAX computers operating under VMS Version 4.4 or higher.

The software can be licensed at \$450 for the VAXstation I, \$1,800 for the MicroVAX II and \$10,800 for the VAX 8800.

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Digital Equipment Corp., 146 Main St., Maynard, Mass. 01754, or call (617) 897-1111.

Module integrates voice and data

Itron unveiled a voice channel adapter to enable its Commander TL7 multiplexer to transmit adaptive differential pulse-code-modulated voice channels at 32K bit/sec.

The adapter plugs into the seven-channel time-division multiplexer, which provides a 56K bit/sec link. With the adapter, the multiplexer can provide a tie line supporting four-wire E&M signaling to a remote private branch exchange. The voice card costs \$550.

Itron, a division of Infotron Systems Corp., 130 Gaither Drive #116, Mount Laurel, N.J. 08054, or call (800) 423-8044.

Unit lets five PCs share a single printer

Digital Products, Inc. introduced a device that enables five personal computers to share a printer.

The PrintDirector Junior's 250K-byte print buffer is expandable to 500K bytes. Personal computers attach to the device via an RS-232 link. The product's software appears as a pop-up window from within personal computer applications and enables users to cancel print jobs and send customized printer setup commands.

The product can be upgraded to the firm's six-port PrintDirector 6, which supports serial laser printers and a 1M-byte print buffer.

PrintDirector Junior costs \$495. Digital Products, Inc., 108 Water St., Watertown, Mass. 02172, or call (617) 924-1680.

Unisys debuts new BTOS

continued on page 17

for workstations. BTOS II also supports connections to Unisys A, V, and 1100 Series mainframes, connections to Unisys UNIX-based computers, gateways to IBM Systems Network Architecture networks and connections to X.25 public data networks. The proprietary operating system runs on Unisys' line of Intel microprocessor-based workstations.

The fact that BTOS is a multi-user operating system means it can accomplish more than MS-DOS or even OS/2 in a network environment, Unruh maintained.

"We're in a different market, one that takes on the IBM System/36, System/38 and 9370 environments," he said.

TeleCluster debuts

Unisys also introduced the TeleCluster wiring scheme, which was developed in conjunction with Convergent Technologies, Inc. and David Systems, Inc. TeleCluster is designed to link workstations in what Unisys calls "clusters" and carries both voice and data.

Any Unisys workstation run-

TALKING TECHNOLOGIES, INC.

Bigmouth turns PC into versatile voice system

BY JIM BROWN
New Products Editor

OAKLAND, Calif. — Talking Technologies, Inc. recently introduced Bigmouth, a product that enables a personal computer to handle voice mail and telemarketing tasks.

Using a proprietary algorithm, Bigmouth digitizes voice received from a standard telephone and passes it in real time to the personal computer, which stores it to disk. Each minute of speech requires 150K bytes of disk storage space.

Used for voice mail applications, the product can support up to 100 voice mailboxes and store up to 1,000 messages. Messages can be up to 2½ minutes in length. The voice mail function also supports password security. Users can access voice mailboxes from remote telephones. In addition, the product can be programmed to forward messages to another extension.

When used as a telemarketing tool, the product can be configured to dial a list of telephone numbers and deliver a prerecorded message. Also, it can be configured to record a response to the initial message.

For inbound telemarketing, the product can answer incoming calls with a prerecorded message. The product can then play back recorded messages instructing the caller to touch a digit to access other prerecorded messages. For example, a caller seeking an interest rate quote from a financial institution

can be greeted with a message and instructed to touch one for loan rates and two for savings rates.

The speaker provided with the product enables users to listen to voice messages or monitor call progress without a telephone

Bigmouth can also answer incoming calls with a prerecorded message. The product can then play back recorded messages instructing the caller to touch a digit to access other prerecorded messages.

handset. Once the user picks up the telephone handset, voice output is automatically transferred to the telephone handset.

Optionally, Bigmouth supports a programmer's toolkit, which enables users to integrate voice into personal computer applications. With the toolkit, users can create talking demonstrations, as well as tutorials and applications with sound effects, a company spokeswoman said.

Other standard features of the product include the ability to record voice notes on the personal computer and an activity log, which time-stamps and dates all activity processed.

The spokeswoman said the product is currently being tested for compatibility with private branch exchange equipment.

The product also works in conjunction with burglar alarms or detection systems that support relay switches. Bigmouth can be configured to receive signals from those systems and dial a security company, local police or designated employee to deliver a prerecorded message.

Bigmouth consists of a personal computer add-on board, software, twisted-pair cable to link the board to a telephone via RJ-11 jacks and an external speaker.

Supporting a single trunk line, the product requires an IBM Personal Computer or compatible with 256K bytes of random-access memory and DOS 2.0 or above. The firm recommends the use of one floppy disk drive and one hard disk drive but says the product will operate with two floppy disk drives.

The Bigmouth product is priced at \$239, while the programmer's toolkit is priced at \$79.

Talking Technologies is headquartered at 6558 Lucas Ave. #301, Oakland, Calif. 94611, or call (415) 339-8255.

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NETWORKING

Opinions

REVENUE REGULATION

ALAN PEARCE

Consider the alternatives

Federal Communications Commission Chairman Dennis Patrick is wasting no time in tackling the major regulatory issues. He recently launched a controversial rule-making that will examine alternatives to current rate base rate-of-return regulation.

This is the single most important issue facing the telephone companies, and if some changes aren't made soon, it will hinder the ability of the regulated carriers to compete.

The FCC specifies a maximum rate of return the regulated carriers can earn. This return is calculated based on each carrier's rate base, which the FCC describes as "the value of the property that is used and useful in providing the public with the services that are needed." In other words, the carrier's capital investment.

In regulatory economics, the Averch-Johnson-Kahn effect demonstrates that companies that earn their profits as a percentage of their capital investment tend to invest excessively in capital facilities, even when the facilities are less efficient or more expensive than labor. They do this because by investing more, they can expect to earn more.

Rate-of-return regulation is ineffective without efficient regulatory oversight, and the difficulty of maintaining such oversight has prompted the FCC to introduce many competitive spurs into the regulatory process. Now that competition is emerging, the FCC is asking whether rate base rate-of-

turn regulation is still necessary.

Acceptable and efficient alternatives have been under consideration for several years. The issue has come to the fore recently, however, because all of the Bell operating companies, along with AT&T, are exceeding their allowable rates of return. These companies fear they might have to reduce their prices or, worse still, refund money.

In addition, most telephone companies have investment bases that aren't growing rapidly, and in some cases, these may even shrink. Serious problems for these carriers will result if the existing rate-of-return formula isn't modified. Consequently, the carriers are pressuring the FCC to allow them to exceed their maximum rates of return.

Meanwhile, the FCC has launched its first proceeding to examine five alternatives:

- The social contract approach, which would freeze prices for some services for a specific time period while totally deregulating others. Prices would be periodically adjusted by regulators. This approach protects universal service. Local rates for basic services would be kept low and might even be subsidized by revenues from other services.

- Market basket regulation, in which the overall financial performance of a telephone company is compared to other nonregulated companies engaging in "similar risks." Telephone company profits would then be adjusted accordingly. However, since the telecom industry is still at least partially a monopoly, finding a nonregulated company with similar risks might be difficult.

- Banded pricing regulation would allow

telephone companies to raise or lower rates within a predetermined range without review by federal and state regulatory bodies. However, users opposed to increases within the range could still force a regulatory review through petition, and telephone companies might be tempted to keep prices at the ceiling level.

- Total deregulation would begin with small companies and expand to the larger ones, subject to study and review by authorities.

- With price cap regulation, rates for certain basic services would be capped for a prolonged period while prices for all other services would fluctuate with the market. This is similar to the social contract alternative, except that price cap regulation would evolve to deregulation of all services.

Under the new chairman's direction, change and experimentation are in the policy-making winds. But Patrick faces a tough battle with most state regulators, who favor continuing the current regulatory framework, which has been in place for more than 50 years.

With congressional and presidential elections coming up next year, it's unlikely that revolutionary regulatory changes will occur soon. However, an alternative could emerge on a trial basis and then eventually become permanent. Price cap regulation, which the FCC favors, is the most likely alternative.

There's no perfect solution to the rate-of-return problem, but without some form of adjustment, it's likely that the telephone companies will focus on new businesses, to the detriment of basic telephone service. □

Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.

INDUSTRY OBSERVATIONS

BRIAN JEFFERY

Cement overshoes

No one knows what happened to Jimmy Hoffa. He was last seen at the Macchiusi Red Fox restaurant in Detroit, and where he now resides is a matter of public speculation. Gone, disappeared off the face of the earth, is Jimmy Hoffa.

A comparable, but less well-known case involves Rolm Corp., a former Calif.-based company that, it is believed, was involved with a large and powerful organization known for its ruthless methods.

Originally a maker of ruggedized computers for the military, Rolm branched out into private branch exchanges and telephones in the '70s. This brought the company to the attention of the aforementioned organization, an East Coast outfit whose three initials few dare to name.

Jeffery is managing director at the International Technology Group, a Los Altos, Calif.-based research and consulting firm specializing in the IBM market.

Says one source, who prefers to remain anonymous, "The big guys, they wanted in to the telecom business. They figured they were going to have turf hassles with [a large long-haul carrier that was involved recently in congressional hearings and is often in trouble with government agencies], and it looked like a sweet deal." But Rolm didn't deliver.

One local law enforcement official speculates, "They couldn't offer the market share. The East Coast guys were expecting some heavy stuff: voice/data integration, enterprise networks, that kind of thing. Rolm looked like it had innovation, marketing and management. But most of the green stuff was coming out of MIL-SPEC. Then they talked synergy and those East Coast guys didn't comprehend that. They were in the computer racket, so they figured, 'hey, telecom, that's a good business to be in.'" As for Rolm's fate, the official just shrugged. "Those

guys," he observed, drawing his finger across his throat, "they don't like mistakes."

Things started going bad with the Organization in 1985, when the giant was under pressure from its former ally, the Wall Street Gang. The Gang was demanding improvements in the Organization's take, and Rolm's performance was a source of irritation. Losses were as high as \$100 million in 1986, the last year that Rolm was seen whole. The Organization began taking over Rolm's operations in Europe, Japan and smaller countries and had its own people push Rolm hardware. Then the Enterprise Marketing Program was devised, which had Rolm people out marketing with the Organization's own people.

"It was a brute force deal," said one user, "you know, 'you've got our computer gear, take the PBX.' They were pulling out all the stops — network management, support engineering industry standards, T-1 muxes

and the lot." But goaded too far, telecom managers refused to buy. Stated one witness, "The guys from the Organization hadn't seen anything like it before. The telecom guys just looked at the gear and said, 'that's no big deal. We can get better stuff on the street.' It wasn't even real digital and had no buses to speak of. They were looking for the real hot sellers: PCM, ISDN, virtual circuits. They just laughed at the box the Organization was pushing."

Things went from bad to worse

You needn't stand on a soapbox to make yourself heard. *Network World* is recruiting regular columnists for the upcoming editorial year. Contributors must be willing and able to contribute timely, literate, informed and opinionated columns of 600 to 750 words per month. Commitment to meet deadlines for at least one year is necessary.

Contact Steve Moore, features editor, *Network World*, Box 9171, Framingham, Mass., 01701, or call (617) 879-0700, ext. 732.

Opinions

►TELETOONS — By Phil Frank

I'm not so sure I like this new network faultfinding software.



as the Organization started to lose patience. One Rolm executive after another left, and finally, earlier this year, a big chunk of Rolm disappeared altogether. Rumor has it that it was merged into something called Information Systems Group in the White Plains, N.Y., area. Estimates place the number of Rolm people who disappeared as high as 6,000.

Shortly thereafter, the Organization's West Coast chief, Ray "Manufacturing" AbuZayyad, moved in to take over what was left of the once-proud Rolm operations in Santa Clara, Calif. A climate of fear now hangs over the town. According to one Santa Clara source, "We're not really surprised. You've got to understand that these guys are heavy hitters. They don't think twice about putting you into early retirement. I've seen families that don't even know where their father's gone. One day, you're managing; the next, you're out selling System/36s in the Nome, Alaska, branch or fixing 3274s in Cleveland. It's tough."

As time passes, hopes fade, and theories abound as to who ordered the hit. Says a local investigator, "I'm not sure that the top guys

were involved. It's the kind of thing where you have an outfit losing money, and the finance people might just have come in and said, 'Look, we've got quarterly financials coming up next month. This is red ink — we don't want to see it any more.' That would have been enough."

The Organization probably will stay in the telecom business, however. As one source puts it, "There's a lot of street talk about bandwidth, muxes and voice/data switches. The betting is that they're going to OEM — buy it legitimate and then private-label it. They've been burned, and they won't go back to acquisitions and joint ventures." There may never be an answer now to the question of what happened to Rolm.

In a related development, concern is growing about the whereabouts of a prominent Washington, D.C.-based long-distance carrier. MCI Communications Corp. was last seen attempting to negotiate a joint-marketing program with a corporation described by witnesses as "large and blue." Anyone who has information on the whereabouts of MCI should immediately contact... □

PROCUREMENT MANAGEMENT

NATHAN MULLER

R&D revelations

Upgrading a telecom network today is fraught with risk. As a communications manager, you can easily find yourself locked into proprietary technologies, constrained by limited configuration flexibility or, worse yet, paying for products that don't even exist.

Obtaining financial information from potential suppliers is a good idea, but it's not enough to minimize the risk inherent in dealing with privately held firms, venture capital-financed start-ups or companies employing proprietary technologies. Any resourceful supplier can show you cash in the bank. For an accurate picture of product reliability and the supplier's continuing viability in the marketplace, what's needed is a detailed review of the supplier's research and development activities.

First, check the nature and scope of the supplier's R&D efforts. Without a formal R&D program and dedicated staff there is assurance neither that the product has long-term reliability nor that enhancements will be developed to extend the useful life of your investment.

Find out what industry-first features the R&D group is responsible for. The answer will validate sales claims of "innovative" products. Also ask: What is the life span of products already in the market? How many design changes has the product undergone since its initial release? The answers will tell much about the quality of product design and level of customer satisfaction.

To determine how effective the supplier is in planning new products and enhancements, find out the ratio of completed vs. cancelled projects. Also, ask what percentage product development costs are of annual revenues. Are new projects planned and released fairly regularly, or does the supplier's record look too uneven, perhaps to the point of being haphazard?

These questions may reveal a high-risk strategy in which the vendor throws money at projects to score technological breakthroughs intended to capture instant market share. If so,

Muller is an independent communications consultant in Huntsville, Ala.

steer clear — that strategy rarely works, even among the industry giants.

Look into the components that R&D is using in its prototypes. If they're relatively new, product rollout could be hampered by an initial scarcity of these components. All too often, a supplier bases product development efforts on trial quantities of components, with the intention of committing to bulk quantities once the product reaches the manufacturing stage. This kind of arrangement is no guarantee that production quantities of components will be available when they're needed.

Make sure the R&D effort includes compliance with industry standards, so that you're not stuck with one-of-a-kind products that aren't compatible with the offerings of other manufacturers. Don't be fooled by the argument that the technology was developed to overcome limitations that were overlooked by industry standards.

You may find yourself in a never-ending cycle of committing more time and spending more money in a vain attempt to get things running smoothly — to say nothing of trying to repair damaged credibility within your organization.

Beware especially of start-ups using proprietary technology. A lucky few can pull it off in such areas as T-1 multiplexers, where standards count for less than R&D that produces leading-edge features and performance. But a proprietary product development strategy is naive when applied to local-area networks, for example, where the industry is coalescing around standards, even if they are de facto.

Finally, never forget that the purpose of making sure your vendor's R&D effort is centered around standards is to safeguard your investment by providing configuration flexibility and a future growth path — both of which impact your ability to modify the network in response to changing business requirements without incurring unnecessary costs.

Obtaining financial data on telecom suppliers can help you make your purchasing decision. But researching supplier R&D efforts will tell you more about the future than any balance sheet-based economic forecast. □

Features

August 3, 1987



ILLUSTRATION © 1987 KEVIN POPE

How to grow a hybrid

It takes more than technical skills to successfully graft private and public networks.

BY MARY JOHNSTON
Special to Network World

With the variety of options available for providing wide-area voice and data connectivity, many communications managers are refusing to commit to one service or technology exclusively. Instead, they're mixing and matching technologies to create customized, hybrid networks. As these hybrids become the rule rather than the exception, they're changing the way managers go about their business.

Increasingly, corporations with revenues ranging from \$150 million to a billion dollars are turning to hybrid networks. Their goals are to improve functionality, tighten cost controls and open new lines of business that require enhanced telemarketing or data links to customers and suppliers.

The networks these corporations construct typically include a range of public and private services supported by numerous transmission technologies. For example, users may combine public, common carrier-based services such as WATS; virtual network services (VNS) and value-added networks with private leased lines (2,400 to 1.544M bit/sec); very small aperture satellite networks;

privately owned microwave and fiber links; and other technologies.

The way it was

Historically, networks evolved to support specific applications. Voice options were limited to WATS, foreign exchange and 800, with private branch exchange tandem networks supporting certain corporatewide functions such as dialing plans and call screening. AT&T and, more recently, the other common carriers ran traffic studies to determine the most appropriate WATS banding scheme and trunking requirements.

Data networks comprised mainly leased multidrop or point-to-point and switched point-to-point connections between remote locations and regional or national processing centers. Many of these data networks were designed by major computer vendors such as IBM or Burroughs Corp.

Whether for voice or data, once a topology was created, it changed incrementally to support growth but rarely was reevaluated from top to bottom. Further, most users lacked data bases to capture ongoing usage information for translating actions. In this environment, communications managers who could negotiate favorable contractual terms and preferred customer discounts were highly valued.

In recent years, however, under

the influence of the Second and Third Computer Inquiries, the AT&T divestiture and IBM's entry into networking, network planners face many more options. Services such as T-1 leased lines, VNS, bulk access and discounted WATS services such as AT&T's Megacom and Switched 56, MCI's Prism and other transmission services have appeared.

Meanwhile, private ownership of satellite networks, microwave and fiber have become economically viable. As a result, managers are left with the unenviable task of sorting out competing claims for these technologies.

It's not unusual for a corporation to consider a combination of VSATs, packet networks and leased lines to support the same data applications. Likewise, private PBX tandem networks, WATS, VNS, foreign exchanges, 800, AT&T's Readyline, Megacom, Prism and a plethora of similar competitive services are available to support voice environments.

In addition, integrated voice and data, achieved by using T-1 lines to carry voice and data circuits, is an increasingly attractive option. Even at the local access level, voice/data integration using T-1 pipes or privately owned bypass facilities is growing.

Hybrid networks can greatly improve functionality and cost con-

Continued on next page

Johnston is a senior consultant with BBN Communications Corp. in Cambridge, Mass.

From previous page
trol, but they also make a manager's job more complicated. To successfully plan and implement a hybrid network, managers must first look to their company's business environment.

At a minimum, managers should evaluate corporate attitudes regarding:

- Expected growth or contraction of the business;
- Degree of movement expected in geographic locations;
- Public vs. private ownership;
- Dedicated vs. on-demand capacity requirements;
- Amortization vs. expensing of communications equipment;
- Centralized vs. decentralized management styles;
- Distributed vs. centralized computing requirements;
- Level of security required.

The technologies included in a network and the degree to which a hybrid can adequately service the corporation are determined by corporate policy in these areas. For example, firms that prefer ownership and control of their resources will favor hybrids geared toward private facilities rather than virtual networks, which require the user to trust a single vendor's ability to operate it. By contrast, companies that expect rapid turnover in office locations due to mergers, acquisitions, divestments or business slumps may benefit more from a VNS that requires minimal capital investment and can be quickly reconfigured as business needs demand.

Meeting vendor challenges

Hybrid net managers also face new challenges in managing vendors. The problems of compatibility across vendors and equipment, coordination of circuit provision and testing, and supporting network management and maintenance increase with each different technology and type of vendor equipment added to a network. For example, managers of data networks based exclusively on leased lines simply call the leased line vendor to resolve problems in uptime, error rates and signal degradation. The vendor is responsible for determining whether the trouble lies in the local access lines, the long-haul trunks, the network-based multiplexing equipment or somewhere off the network — in the users' models, for example.

In a typical hybrid environment, such as the one illustrated in Figure 1, the user may have to coordinate troubleshooting among multiple local exchange and long-haul carriers and satellite vendors, T-1 multiplexer vendors and even privately owned fiber or microwave systems. Issues of jitter, clock source and coordination of circuit testing must be resolved for all network components. Pointing the finger of blame is particularly rampant in the hybrid environment as three or four vendors may have to work together to troubleshoot a specific problem.

The problems of maintenance and repair of hybrid networks are akin to those all users have faced

since the breakup of AT&T. For the first year, circuit installation and repair times increased as AT&T and the Bell operating companies learned how to work together. While the carriers have developed standard management procedures over the years, the weaknesses of multi-vendor environments are still evident when something out of the ordinary occurs. Use of bypass and privately owned network equipment such as multiplexers makes the management problem even more difficult.

Users demand more

As networks have become corporate utilities similar to mail services and computer time-sharing systems, users have become more demanding. Instead of every office or division fending for itself, central policies, vendor discounts, ongoing network planning and fine-

To succeed, network planners must invest in corporatewide information collection and consensus building. Each business unit should have a chance to voice its concerns, priorities, business goals and communications preferences.

No company wants to go through the time and expense of request for proposal production, vendor evaluation, contract negotiations, pilot testing and, eventually, major circuit terminations, circuit relocations and installations on a regular basis. Changes in dialing plans, chargeback schemes and levels of service shouldn't be made lightly. Implementing a corporate hybrid network utility is a once-in-a-career effort, so it must be planned right the first time.

Planners embarking on the road to hybrid networks should plan on a minimum of two years to go from preliminary data collection, ser-

acceptable performance.

As helpful as these management objectives may be to smoothing vendor relationships, they're even more important for managing users. Hostility is minimized when users have access to effective feedback, when they can see complaints are resolved quickly and don't reappear the next day.

This process begins with a rigorous quantitative and qualitative requirements analysis designed to identify the existing state of affairs and to articulate user concerns into planning efforts.

Next, a network model based on the quantitative portion of the requirements review must be constructed. Future capacity and configuration demands are interpolated from the qualitative portion of the requirements analysis and also factored into the model.

From this model, planners can make decisions intelligently with regard to future provisioning of network services, acceptable changes to performance levels and enhancements to relieve existing problems. Planners should also take performance measures to serve as planning benchmarks. Finally, a feedback loop must be established as a mechanism to integrate new user requirements, complaints and strategies for problem resolution into the ongoing network planning effort.

Three steps to selection

Choosing a hybrid network should be a three-stage process. The planner should begin by identifying user priorities, corporate business directions and future business opportunities that can be enhanced through the use of networking technology. This information should be entered into a detailed data base on voice and data usage, performance metrics, computing environments, protocols and interfaces. This task is difficult, but it's the underpinning of successful network design.

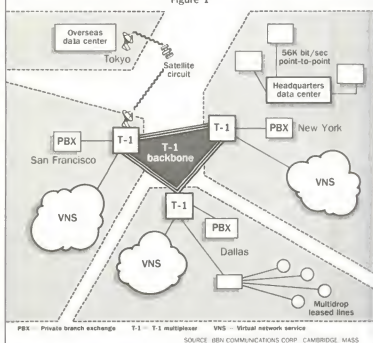
The second stage involves matching business priorities to technological and service options. To start, the planner must construct a list of corporate attitudes on issues such as control, ownership and growth, and then evaluate viable technologies in terms of how well they match these attitudes. This narrows the choices down to a short list of technologies that deserve further investigation.

Finally, the planner must think specifically about technologies and services. How well do each of the options on the list support required applications? Can a hybrid of these technologies support corporate goals even more effectively? What's the result of cost/benefit and return on investment analysis for these options?

This type of comprehensive analysis, supported by rigorous quantitative information on usage patterns, business growth and service pricing, can result in an effective hybrid network architecture that will evolve in step with the business requirements of the corporation it serves. □

A typical hybrid network

Figure 1



tuning are supported by a corporate staff. Now, user groups may be sent direct bills rather than paying for communications services as part of overhead expenses. Consequently, they want to be sure the corporate service is at least as good and no more expensive than services they could arrange on their own.

In organizations where management is more centralized, corporate management may control all communications staff. In other firms, most technicians continue to belong to individual business units, while a small corporate staff acts as a consulting group to all business units in the company.

A hybrid network is rarely an incremental extension of an existing network topology; rather, it is an extensive reworking and interweaving of formerly separate resources. As with any major change, many individuals and groups throughout the corporation may feel threatened, or at least suspicious, of this change.

vice and technology selection to network design, pilot testing and network cutover.

Under new management

Because hybrids rely on many vendors and technologies, the user company must take responsibility for many more choices than it would have to shoulder in a more uniform environment. Often, this means new management structures must be developed.

Determination of performance goals regarding such items as error rates, transaction turnaround times and network availability, and management procedures regarding such items as trouble response systems and chargebacks are critical for successful management. Without operational goals, the planner may never know whether the network is doing the job. It's difficult enough to make vendors work together when hard performance data exists, but it's almost impossible when no mechanism is available to document un-

Group therapy

Expert insights into hybrid networks



To communicate within and outside their organizations, more and more regional, national and international concerns are turning to hybrid networks — intermeshed webs of private and public-switched communications facilities. In this special feature, Network World presents timely hybrid net advice from prominent users, consultants and vendors.

David M. Edison, director, Corporate Information and Communications Systems, Westinghouse Electric Corp., Pittsburgh.

"The choice between public and private networks is dictated by the market. I can only afford private lines in areas with a high concentration of activity. In areas where traffic density is low, I'm more interested in buying from some organization that can afford to run the facilities in those remote regions."

"Although running a hybrid net-

work looks like a highly technical enterprise, it ends up being a people enterprise. Networks work well when everyone works as a team. Bring in the vendors, get your customers involved and be prepared to put in the time and effort. With your staff, you're going to have to put in a fair amount of time for training. It's quite an investment.

"I would encourage potential users to be specific in what they expect from a vendor. The tendency is to listen to the vendor's tariffs, do a simple calculation and be fascinated by the features they offer. But most phone companies have difficulty getting their bills right."

George Colony, president, Forrester Research, Inc., Cambridge, Mass.

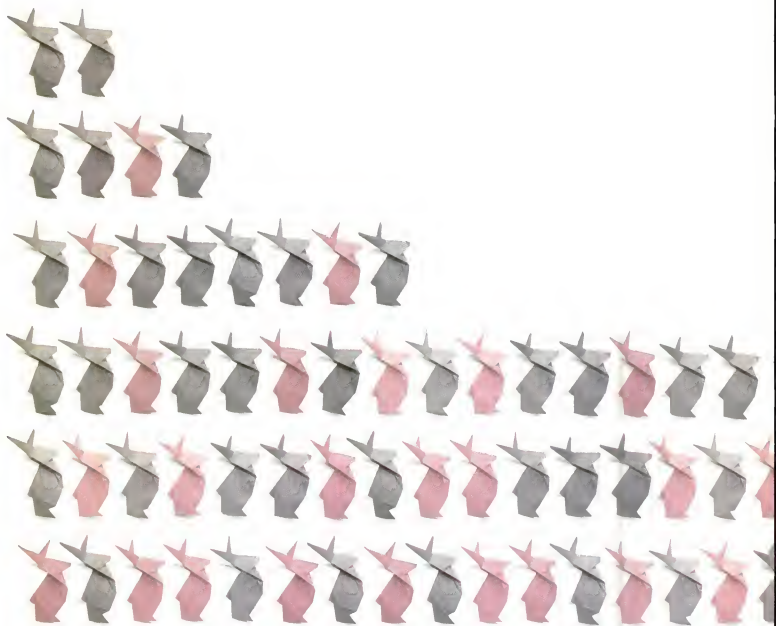
"Going with a hybrid, as opposed to a fully private network, is usually more cost-effective. The vendors have more competitive of-

ferings, a wider choice of network segments and lower costs per bit per mile. What you give up, of course, is ultimate control, but that's not that big of a risk.

"In high-security applications, a hybrid net may not be the best choice. These dictate a fully private network. Also, highly time-sensitive applications, such as a brokerage or banking environment, would require a fully private net."

"Users must ask themselves questions. No. 1: What resources do they have to manage which segments? No. 2 is costs: Is the public offering going to give you substantially lower costs than a private one? The third point is your strategic direction. If you plan to have your own fully private network utility on-line in two to three years, then you may want to get experience now with as many private pieces as you can. A fourth

[Continued on page 30](#)



How to avoid the pen

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consideration is the type of application. If it's short-term, go with as many public pieces as possible.

"One final point for consideration is how to isolate problems between the public and private segments. You can't let vendors pull the wool over your eyes; you've got to have the upper hand in

"You've got to have the upper hand in terms of expertise and control. If you don't have that capability, you've either got to develop it or cross your fingers."

terms of expertise and control. If you don't have that capability, you've either got to develop it or cross your fingers."

Tom Healy, director of networking operations, the University of Alaska in Fairbanks, Alaska.

"We do data and voice communications over private microwave facilities, as well as carrier-provided T-1 and analog circuits. It networks pretty much the entire state of Alaska. Bits and pieces have been in place for a long time; it's really grown over 10 to 15 years.

"We do as much planning as we can, but we're run by an annual budget. We use equipment from about a dozen different vendors, with T-1 drop-and-insert multiplexing and conventional modems. We are also bridged into the state of Alaska's SNA network.

"We don't have the options available to people in New York. There's never going to be fiber optics stringing places in Alaska together. Never is a long time, but you haven't seen them trying to put a road in here. You can't keep the roads in place, because the permafrost just tears them up.

"We also have very interesting satellite delay problems that have to have special accommodations. We use satellite services twice a year when the sun gets in the wrong place. There's a lack of technical expertise on the part of some vendors. You mention T-1 to the common carriers, and they say, 'What is that?'

"It takes perseverance to keep the system operational. Our technicians do a lot of the maintenance, and they're moving from a strictly data world into an integrated data/voice/other things' world. They have to learn about PBXs now, where all they worried about in the past was data stuff.

"We do the best we can with what we have. It's really nice if you can get executive [upper management] commitment. High-level commitment is very important. It makes things a whole lot easier."

Page Montgomery, vice-president, Economics and Technology, Inc., Boston.

"Economic shifts are making

picking the optimal hybrid network combination difficult. In February, the FCC allowed AT&T rate reductions in its long-haul T-1 lines, which amounted to over 20% for many people. Other carriers not only matched AT&T's price reductions but exceeded them. That tipped the balance back toward private facilities. Now, by dis-

counting its SDN tariffs ["AT&T cuts SDN rates, offers dial-up access rates," *NW*, July 20], AT&T's shifting that mix back again.

"A lot of users just don't have the wherewithal to keep recasting their networks every other week, so it's harder to deal with a hybrid network. The trade-off is, do you have the expertise to keep judging how to make a hybrid network or do you want to hire outside consultants? The big carriers say 'just

"Users should make the minimum length of commitment consistent with their needs and recognize that at any given time, they may not have the lowest-cost solution."

turn it over to us and be done with it.' But you may end up buying at a higher price than if you wait. Users should make the minimum length of commitment that's consistent with their needs and recognize that at any given time, they may not have the lowest-cost solution."

Joaquin Gonzalez, vice-president of enterprise network strategies, Gartner Group, Inc., Stamford, Conn.

"Most users don't believe that they're going to get leading-edge capabilities through the public network. They think such features are first going to be offered through [customer premises equipment]. In addition, anything a vendor makes available through the public network to me as a user is also made available to my competitor. If I am using my network as a way to differentiate myself from my competitor, that doesn't sound like a very good idea.

"The mega-key issue is how much ought to be on my private network and how much is reasonable to let the public network carry? For voice, the differentiating factor is almost exclusively economic. When you're talking data, you've got to ask yourself, 'What part of my traffic is strategic to

the firm?' And the answer will decide how far your private facilities should extend.

"If data is strategic, the user has a couple of choices. One is to swallow hard and pay the private-line rate. Choice 2 is to get a little kinky and start looking at VSATs, alternative transport suppliers, FM sideband radio and other nontelephone company solutions. Generally, users don't do that.

"When you hear people from AT&T talk, they'll make it real clear that they think the world ought to be switched, usage rated and software-defined, and that you do leased-line or high-capacity digital networking at your own risk.

"Most users who go the [US] Sprint or MCI route do so not only because there's some economic advantage but also because there's less coercion. They're more flexible and willing to meet your requirements, rather than to trying to fit you into their vision of the world."

Jim Domanico, director of network products, Sun Guard Recovery Services, Wayne, Pa.

"One of the most important issues is certainly capacity. Users might be unaware of the amount of traffic traveling on such a network — especially in areas where voice

Inc., New Canaan, Conn.

"Leased lines have always been attractive to users who want to install a network and leave it alone — who don't want to manage it. Anything above this requires some sort of network optimization. It requires the skill of some person who knows the alternatives — who knows the technologies and tariffs, and the benefits and drawbacks of each.

"You have to get yourself a network engineer. You can't just promote somebody into it. If you promote the guy who used to order your leased lines to network manager for a hybrid network, you'll be in for a lot of trouble.

"One thing to consider when selecting a provider is how strongly you will be committed to that provider. Companies come and go. If my [provider] makes the wrong choice, will we come and go with them? Is there an alternative? It's a strong negative when something is unique and not easily replaced."

Richard Sprengel, manager, product-line marketing, Tymnet/McDonnell Douglas Network Systems Co., San Jose, Calif.

"The manager with a hybrid network in place has a major concern with compatibility. In order to take advantage of public opportunities on the hybrid, will the manager have to make significant changes to current private facilities to accommodate those public facilities?"

"If someone has a private network and is interested in a hybrid, it's an issue of utilization. The private net manager knows the costs of putting a leased line out there, a transmission facility of some sort and hardware on site. He or she knows what the utilization would be. If there are public facilities there and utilization is low, the manager is better off using the public facilities.

"Managers using private or hybrid nets already have some level of control. For those using public vendors, the issue of control usually is a driving force toward moving to a hybrid.

"In some cases, there's complete visibility through the gateways into the public portions of the network. In other cases, visibility

and data traffic are being managed by separate entities within the corporation, without one realizing what the other is doing.

"Facilities to the outside world are something of an issue also. Decisions have to be made on the strategic points at which to place the gateways so all possible alternative paths are covered and so all locations in the network have access to the outside world.

"I would try to get as much tech-

"You've got to ask yourself, 'What part of my traffic is strategic to the firm?' And the answer will decide how far your private facilities should extend."

nical support as possible — as much assistance as can be accomplished. Certainly, the quantification of support is important, as well as construction and diagnostic help during operation. That's the major issue."

Eric Arnum, editor, International Resource Development,

stops at the gateway. You have a lot more compatibility going with a vendor that provides both public and private facilities because you aren't blocked from having a compatible set of features to offer end users. It also simplifies troubleshooting."

Susan Merserau, director of

telecommunications services for Weyerhaeuser Co., Tacoma, Wash.

"We have essentially moved from a private, ETN9-switched dedicated network to a combination of a private backbone with both US Sprint's [Virtual Private Network] and AT&T's [Software-Defined Network], depending on volume, location and geography. We also have just piloted a trial with MCI in the international area.

"When planning, we spent about a year evaluating changes in the private-line structure with respect to tariff shifts. We tried to determine how we wanted to position Weyerhaeuser to move into ISDN capability in the future, and we also tried to leverage off of cost-containment opportunities by selecting vendors whose offerings appeared to meet our own objectives.

"And the evaluation was really based on whether we were going with one SDN or a combination.

"One of the challenges has been that Weyerhaeuser's net goes into so many rural locations. Trying to put together all the changes in the tariffs, the technologies, the regulatory environment, plus the business and organizational changes tends to be much more of a chal-

good to have that in an RFP. Also, state what kind of line and switch utilization you would like.

"If you don't, sometimes the vendor assumes you want 100% switch utilization. Obviously you

don't, because at peak loads, you'd have no capacity left.

"Most of the RFPs we see are quite specific. They show what the customer's asking for in the way of protocol support, types of devices

at various locations and traffic. The application is also important.

"If we know the application, we can get a feel for what their needs are.

"Typically, we see customers asking us to explain what the service and support options are: 'Do I have to maintain this thing myself? Do you give me training? Do I buy spares from you? Explain how your hardware maintenance agreement works and what kind of response time I might expect.'

"Or, 'Do you provide ongoing software enhancements? What kind of warranty do you provide?' Anything having to do with support, warranty and hardware maintenance should be asked in the RFP." ■

"Most of the requests for proposal are quite specific. They show what the customer's asking for in the way of protocol support, types of devices at various locations and traffic. The application is also important."

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"There is no one right networking answer, at least no permanent one. I think that putting all your eggs in one basket does not allow you to reduce risks."

length than the actual technical problems we're trying to solve.

"There is no one right networking answer, at least no permanent one. I think that putting all your eggs in one basket, especially in this fast-changing environment, does not allow you to reduce risks. It does the opposite — it tends to tie you to a solution that may not be practical two years from now or four years from now.

"The important thing is to learn how to manage the technologies, to make them work for you, as opposed to getting tied into any one direction."

Merritt Doyle, director of sales support for the Network Systems division of Telenet Communications Corp., Reston Va.

"The request for proposal oftentimes will give us criteria by which to size the network. Certainly, if you know what kind of growth you're experiencing, it would be



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The upwardly mobile manager

BY CLAYTON LEWIS
Special to Network World

Today's strong demand for communications managers offers opportunities for career advancement through job changes. But while moving to a new company offers new challenges, it also involves risk.

Even a good opportunity with a

Lewis is data communications manager for the city of Tulsa, Okla.

fine company can be marred by early mistakes, and it can take months to recover from a small blunder. Following a few basic rules will help keep new managers out of trouble and on the road to success.

■ **Avoid early pitfalls.** Don't do anything to make enemies. As one sage put it, "Friends come and go, but enemies last forever." Don't do or say things that will cause early resentment or anger. Some people may view criticism of their operation as a personal affront.

New managers are outsiders until they gain credibility and acceptance. People are the key to a manager's success. Take a positive, "can do" approach to problems. Then enlist help to solve them.

■ **At the first opportunity, call an informal staff meeting** to introduce yourself. Give a 90-second speech on your educational and technical background and finish with a 30-second discourse on your management philosophy. This type of meeting acquaints your staff with your background and will help

them know what you expect.

Next, open the meeting to questions. People will want to know about you as a person. Be open and volunteer information. An open discussion will set a positive tone for future interactions with staff.

■ **Establish your technical credibility.** Meet with your technical people and ask them about the current operation. Make comments and ask questions that demonstrate your technical expertise, but don't take them on a tour of the outer reaches of your intellect. It's better that people know where you are knowledgeable than where you're ignorant. Share war stories about tough technical problems with which you have dealt, and offer ideas and observations on current problems.

Do something right as soon as possible. A company hires people because they have something to offer the firm. As soon as you can, offer some proven solutions.

■ **Establish good interpersonal relations.** The Golden Rule applies here: Treat others the way you would like to be treated. Courteous professional managers set the pace for their departments.

Also, don't be quick to take offense. Many people, especially technical staffers, may not have the best interpersonal skills.

Recognize that weakness. One new programmer was offended by what appeared to be a snub from a fellow employee. Another staffer informed him that the offending party was always distant at first. Armed with that knowledge, the programmer was able to proceed apace and develop a good relationship with his reclusive coworker.

Deal with interpersonal conflicts directly and positively. Suppose someone else in the organization wanted the job you got. If that person tells you so, you've been given a live hand grenade.

Don't lose it back; disarm it. Don't say, "Tough luck," or "You should have gotten the job." Instead, invite discussion. Say, "You are really interested in this area?" Let the person know you value his or her advice. Establish rapport and gain an ally.

■ **Finally, get to know how the organization works.** Most companies have formal organizations, standards and procedures. Become familiar with them. Then talk to established employees to find out how things really work. There are as many informal organizations and unwritten rules as there are codified ones.

What are the motivating values in this organization? Are people interested in costs, responsiveness to requests, uptime, service to users or other issues? Who are the key players in decision making? What are the taboos in the organization? Knowing the answers to these questions will save much wasted effort and reduce unnecessary frustrations. **E**

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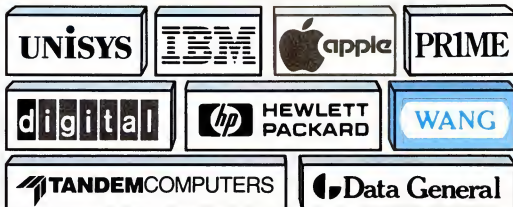
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Open Systems: How open are they?

Wang resculpts its image

Continued from page 1

set about resculpting its proprietary network architecture to accommodate users' persistent demands for openness in the networking environment.

What has emerged thus far, or so analysts contend, is a standards-support package that seems to lack a coherent migration strategy to OSI for Wang users. "It looks like a Rube Goldberg Swiss army knife," complains Dave Terrie, president of Newport Consulting, Inc. "Wang runs half a dozen bands, each with a different protocol, and none of them talks to each other," he says, referring to the

subchannels in Wang's broadband local network. "What they need is a clean network implementation from the wiring on up."

Wang says it has the answer under wraps. "Our internal name for it is the Integrated Network Architecture, and it's been under development for the past three years," says Jean Joseph Cinecoe, senior product manager for OSI products and sculptor of the new architecture. Cinecoe's career is devoted to providing a Wang architecture for migration to OSI from the current Wang Systems Networking (WSN) architecture.

Within the WSN architecture, Wang can build a number of protocol stacks. From Layer 4 of the OSI

model on down, the user can have a transport function based on either Systems Network Architecture or, in the future, Transmission Control Protocol/Internet Protocol or OSI. From Layer 4 on up, users would run Wang protocols. Today, from Layer 4 down, the user can run WSN or SNA.

In the future, the user will be able to run File Transfer and Access Method (FTAM) or X.400 over that same transport. Sloane says he can't specify a date when that will be available because the inter-network routing and addressing structures have to be finalized first.

The architecture, which is for
Continued on next page



From previous page

communications processors and systems like the Wang VS, is designed to support multiple protocols in an open systems environment. Cineco explains. That means the user will be able to access and control multiple layers of OSI protocols directly via a programming interface. The design of the architecture will allow Wang to build in support for new standards as they are drafted.

The whole idea, Cineco says, is to provide Wang with an easier way to implement standards and provide Wang users with a facile integration path from proprietary Wang protocols to OSI. "We've come a long way from the old regime that was strictly proprietary. For three years now, Wang has been fully committed to standards and openness. I still have the 3-year-old memo from Fred Wang saying we must move in that direction now."

Struggling for openness

It appears, nonetheless, that the old regime has left its mark, particularly in the local communications arena, where Wang has struggled a bit to step up to fully functional standards-based local networking.

"Wang says it will support token ring and Ethernet, but as they announce support, they don't come out with a bridge to connect to what they already have," says Terrie. Wang admits to that transgression, but the company says it is working on providing multiple local-area network bridging for 802.3 and 802.5 to customers soon.

A user, however, says that Wang's support of Ethernet technology is "sufficient" and the vendor has promised him more. Tom Courtney, assistant director of telecommunications for Bank of Boston Corp., comments that "Wang has outlined to us their plans for phased implementation of Ethernet support on the VS level. It will be available also on their PC line in the near future. That support will allow us more robust connections among our VSs," he says.

Tim Sloane, a senior product manager with Wang, stands by the company's cased-in local-area network standard. "We have transceivers that allow 802.3 to run across our broadband Wangnet local net. We have also committed publicly to token-ring connectivity — we'll be coming out with products for IBM's Token-Ring local net in the near future."

Cineco adds that Wang's 802.3 products are already being shipped to select customers. Wangnet, he points out, was created very much "in the spirit of 802.3 because it is based on a broadband version of the carrier-sense multiple access with collision detection protocol.

Wang has worked with the Institute of Electrical and Electronics Engineers to get its own proprietary protocol for local network broadband management and allocation accepted as part of the 802.7 standard. The IEEE adopted it with a few minor modifications, Cineco says.

"The only local net standard we haven't committed to is 802.4," Cineco contends, and Wang intends to provide connectivity from its systems to 802.4 through third-party board products.

The Technical and Office Protocol is backed wholeheartedly by Wang as the office automation standard. Cineco says he has a product manager who does nothing but manage Manufacturing Automation Protocol/TOP relations and implement protocols and products

ronment, systems vendors have to contend with another flock of communications standards such as X.25, X.400 and FTAM.

Sloane boasts that his company has supported X.25, the packet-switching transport protocol, for some years now. Wang markets a packet assembler/disassembler product that allows a Wang workstation to look like an asynchronous device as it communicates with a remote host over X.25.

The X.25 product line also in-

"Wang Laboratories is committed to providing communications products that are compatible with international Open Systems Interconnect standards. Standards are not an end in themselves; rather, they are the means to providing information solutions that can be integrated across vendor lines. We indeed look forward to the time all communications and networking among systems from all vendors are universal and transparent.

However, the objective of Wang's approach toward standards is protecting the customer's investments — investments in hardware, networks and software. While we are committed to compatibility with OSI standards, we believe that OSI implementations today do not offer the rich features and functions found in proprietary communications architectures, such as Wang's Systems Networking, IBM's SNA, and [Digital Equipment Corp.'s] DECnet.

To provide the customer with multivendor integration today, Wang provides products that are compatible with leading de facto standards such as SNA and TCP/IP. Over the next several years, Wang communications products will provide flexible, cost-effective migration paths to standardized Open Systems Networking."

Paul Demko Jr.
Vice-president
Communications
Systems development
Wang Laboratories, Inc.

that MAP/TOP has specified with in the 3.0 environment.

Unfortunately, Cineco concedes, Wang is not too active in MAP. "I have a problem with MAP. The protocols are always stepping ahead of themselves to provide network management and directory services before the OSI standard for those are even in draft form."

If analysts seem skeptical about Wang's prowess in the local area, at least one user is perfectly content. John Wheeler, director of MIS for Grace Specialty Chemicals Co., has Wang equipment throughout his company's 13 divisions. "Wang allows us to tie our terminals back to our VS with any major LAN — they can support Ethernet, IBM's Token-Ring, AT&T's Premises Distribution Systems, FastLAN, which we use — anything we want," he reports. "I think Wang is a leader in local- as well as wide-area standards."

Outside the local network envi-

cludes a personal computer implementation, which is used on WSN to transmit Wang protocols across X.25. Sloane said Wang has a packet-layer interface that permits customers to write their own private implementations of a network application on top of X.25. "We have every X.25 product anyone else could claim to have," he says.

Wheeler says that Grace uses X.25 transmission all over the world and that Wang's equipment has worked very well with it. "I think Wang is a potentially major player in the X.25 arena," he says. Wang has a public X.25 network called WangPac that customers use as a backbone net.

Bank of Boston's Courtney is also high on Wang's X.25 support. "Wang supports a rather robust X.25 — with support for X.3, X.28 and X.29 parameters — on the VS, the OIS and at the PC level. The only real limitation is that you can't do word processing over an X.25 link, but most people don't

consider that a limitation anyway."

If it is well-established in the X.25 world, Wang has a little scrambling to do to catch up with the X.400 standard for electronic mail. Sloane insists the company has a strong commitment to it and now has an implementation of the standard underway. "This is the year for X.400," he announces, but he won't say exactly when. He made, however, some broad hints about demonstrations and product announcements for Telecom '87, to be held in Geneva, Switzerland.

FTAM, the OSI international standard for file transfer, has come out in an early version that has somewhat limited functionality in comparison to the second implementation, which is due out soon. Wang's first implementation of FTAM has been demonstrated over 802.3 and X.25 and has been certified on OSInet, Sloane said, but he predicts his customers will be a lot more excited about the next phase when it arrives.

Wang was one of the vendors to participate in OSInet. The company demonstrated an FTAM prototype over OSInet connecting to other vendors, and it provided one of two X.25 networks for the project: its WangPac public packet-switching network.

Wang as yet has no support for electronic data interchange (EDI) standards like X12, because, Sloane says, EDI standards have no common transport standard. He expects the EDI industry will, at some point, adopt X.400 as its transport mechanism, at which time Wang will move to support it.

Passing grades

Wang's report card on openness isn't complete without an assessment of its capabilities for supporting other vendors' proprietary protocols, where it seems to get mixed reviews.

Wang's Sloane says the company supports a complete suite of IBM protocols, including Binary Synchronous Communications, 3270, 2780, 3780, LU 6.2, DISOSS and Professional Office Systems (PROFS). Sloane admits Wang does not support Network Basic I/O System, but he says such protocol support is part of its statement of direction.

Wang also supports, he said, a host of other protocol emulations including Burroughs Corp., Sperry Univac Minicomputer Operations and VT100, and it will provide general asynchronous interfaces to customers who wish to write their own asynchronous communications.

Additionally, Wang will work with third-party vendors and customers to provide virtually any interface so users can write whatever protocol support they wish onto Wang products. "For example, we have the X.25 packet-layer protocol, which allows users or vendors to write TCP/IP onto the VS if they so desire."

Terrie applauds Wang's multivendor connectivity capabilities for the most part. "Wang has done well with its gateways to IBM.

They can piggyback well on SNA transport with Wangnet protocols, and they have very good DISSO and PROFS interfaces."

Grace's Wheeler disputes Terrie's high marks for the Wang Office/DISSO bridge product. "It works, but it isn't that easy to use because of the differences between IBM's and Wang's directories," he says, adding that "Wang is very honest about it, and IBM has some

work to do too."

But Wheeler has a bigger complaint about Wang's protocol support. "They have bisync and SNA for the VS, and recently they came out with LU 6.2, but for each protocol, you need another physical line or port. They need to merge those capabilities so it can be done on one line."

Doug Raudonis, assistant vice-president of field systems for Fi-

delity Insurance Co., says, "there were some start-up problems when we tried to hook up our Wang 300 with our IBM 3081, but everything has run smoothly since."

Despite its word-processing image, Wang has rallied behind the standards effort and, in fact, is proud to report that it was one of the first 18 vendors in the Computer and Communications Industry Association that formed the Corpo-

ration for Open Systems (COS).

Today, Wang heads Group 2 of COS, which is dedicated to designing reference implementations, or testing procedures, for assuring conformity among vendors' implementations of standards. "The only way to make OSI a success is to provide comprehensive testing and certification," Cineco says. "It's the only way to protect the user." □

Letters:

Editor:

The product focus on high-speed modems in the June 1 issue ("Slow times for fast modems") was extremely interesting and timely in light of developments in the marketplace. However, several errors need to be addressed.

The article discusses both 9.6K bit/sec dial-up (CCITT V.32) and 9.6K bit/sec leased-line (CCITT V.29) modems. Due to the decision to include just one product from each vendor, none of our V.29 modems was included.

The article states that "despite what the data sheets show, [V.29 modems] operate at half duplex." V.29 covers both full- and half-duplex transmission over leased lines. Full-duplex transmission requires standard four-wire leased lines. Two-wire leased lines, or the dial-up network, are used for half-duplex communications. Many V.29 modems, including Anderson Jacobson, Inc.'s, operate at full duplex.

Second, a built-in time-division multiplexer is mentioned as one of the things V.29 modems have going for them. However, multiplex capability is an optional part of V.29 and is not adhered to by the majority of manufacturers.

The other statement in error says that "V.29s also have no built-in dial backup units and do not automatically fall back to a dial line."

Anderson Jacobson has four V.29 modems with unattended automatic dial backup capability. These modems automatically dial two stored numbers to establish a connection over the switched network if the leased line should fail or if signal quality drops below a certain level.

Two telephone calls are required because V.29 modems are four-wire modems. Two pairs of dial lines are required to maintain full-duplex communications at 9.6K bit/sec.

We are impressed with the interesting content and accuracy of the articles in *Network World*. However, in this case, the analysis was of interest, but the accuracy left much to be desired.

Catherine Hartsog
Manager of
technical publications
Anderson Jacobson, Inc.

John Hunter replies:

As was mentioned in my product focus chart, all high-speed mo-

dem could not be listed due to the large number of products available. Instead, each vendor was asked to select a representative product from its line.

The statement about V.29 modems operating at half duplex referred to their use over the public switched network. Regrettably, this information was omitted in the editing process. By allowing two-way communications over four wires, a modem can be said to provide full-duplex capability.

My article didn't say that all V.29 modems have a built-in TDM, but that the V.29 specifications recommend one and spell out its operating capabilities. Some vendors implement TDM with their products; others offer it as an option.

Editor:

I had to write you a letter about C. Kenneth Miller's letter on modem issues (NW, July 6). I would like to add a different perspective to the portion about 9.6K bit/sec modems spending a lot of time shifting speeds. If you've got a modem doing that, you shouldn't be on that line anyway—dial-up or leased.

Comparing apples to apples and holding all else equal (not changing modem techniques or speeds), the good modems are within a decibel of each other in performance. On a huge network, daily throughput loss can be calculated to account for many lost blocks and messages, but to any individual, a decibel or so isn't too significant.

Also, we should be a bit more conservative in our view of just how rapidly fiber is going to fix up all the circuits. The most troublesome part of circuits, dial-up or otherwise, is the local exchange carrier portion. That's what is most uncontrolled and what most commonly adds the noise. Interstate circuits have rather rigid operational controls for years. When you get a weak, noisy dial-up today, it might be on fiber—but coming to you through a spongy access circuit on the other end.

I think we're in for quite a few more years before fiber/digital nirvana arrives for modem users. Their best action is to get smart and realize that making a modem work is a bit more difficult than plugging in a toaster. There's not going to be a substitute for knowing what you're doing, coupled with the skills to negotiate what you need from your suppliers—both the modem factory and the

common carrier.

Donald E. Kimberlin
Principal consultant
Mordon Services
Safety Harbor, Fla.

Editor:

Your June 8 article regarding the compatibility of Mitel and Summa Four ("Mitel, Summa Four call system bows") was misleading. One could conclude from it that only Summa Four provides a compatible call accounting system for Mitel SMAR-T-1.

Control Key Corp.'s PL Series is also compatible with SMAR-T-1 and has been since Mitel intro-

duced the CLI (Call Line Identifier). In fact, according to Mitel, the SMAR-T-1 CLI will work with most telephone accounting systems. The article mentioned only that the CLI unit could be used with any vendor's PBX, not with telephone accounting systems.

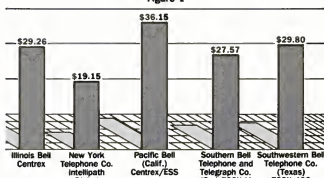
It's probably a matter of semantics but the first line in the article states, "Mitel Datacom, Inc. and Summa Four, Inc. recently introduced..." The CLI unit was introduced in the latter part of 1986.

Sincerely,
Susan Rapaport
Marketing manager
Control Key Corp.

Correction: In the article entitled, "The central office phoenix rises" (NW, July 20), the Centrex costs for each Bell operating company were incorrectly identified in Figures 1 and 2. The correct information appears in the charts below. *Network World* regrets any confusion this error may have caused.

Monthly cost per line for Centrex service

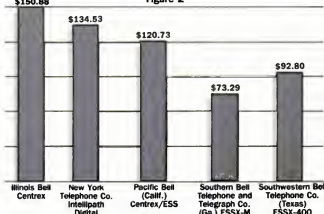
Figure 1



SOURCE: COM/NGRAM HILL'S CENTREX PLANNING GUIDE

Installation cost per line for Centrex service

Figure 2



NOTE: Using a standard configuration of 400 station lines, trunk terminating charges and selected additional features. Figures 1 and 2 compare prices for Centrex service for five Bell operating companies. Station equipment, assumed to have been purchased from other vendors, will be the same rate for all choices. The configuration is representative of most medium-sized installations.

SOURCE: COM/NGRAM HILL'S CENTREX PLANNING GUIDE

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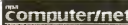
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Texas Air builds gigantic SNA net

continued from page 1

is complete, the company plans to begin selling excess capacity in the form of telecommunications services that compete with those offered by common carriers, such as AT&T and the regional Bell operating companies.

The groundwork for the multi-million dollar overhaul was laid last summer when Texas Air merged the information services departments of Continental and Eastern. The merger resulted in an autonomous operating company, System One Corp., with 2,800 employees, that markets travel information services to Texas Air companies as well as 20 airlines and a variety of travel service companies such as rental car agencies.

The first phase of the overhaul was aimed at identifying cost-saving opportunities. Like many large

companies, Texas Air was supporting a hodgepodge of voice and data networks linked by a large number of low-speed lines. The company hired a consultant, Art Dunham, to recommend a new network design.

Dunham designed a three-tier nationwide backbone network. On the bottom tier, low-speed private lines would be concentrated and fed into 56K bit/sec digital lines. On the second tier, the 56K bit/sec lines would be plugged into T-1 lines that operate at a speed of 1.544M bit/sec. The T-1 lines would then be fed into a dozen backbone locations connected by T-3 lines, which transmit data at a speed of 45M bit/sec.

Ed Gehrlne, executive vice-president and chief operating officer at System One, said the network design will enable the company to realize substantial cost benefits. Gehrlne declined to provide specific cost-saving estimates. He noted that six low-speed lines

cost as much as one T-1 line, which supplies 24 channels. Beyond that, six T-1 lines cost as much as one T-3 line.

Gehrlne said System One was so impressed with Dunham's plan, the company convinced him to become its vice-president of telecommunications.

The second phase of the project, which has not been completed, involves determining where to place the dozen backbone nodes, which will be equipped with sophisticated multiplexers from a vendor that has not yet been selected.

The locations, five of which have already been designated, are being chosen based on a site's current voice traffic. Voice traffic represents the largest chunk of System One's telecommunications costs.

Houston, Denver, Los Angeles, Miami and New York have been selected. On Sept. 1, the company plans to install its first T-3 link be-

tween Houston and Denver. "In six months, we expect to have at least half a dozen T-3 lines up and running," Gehrlne said, adding that installation of the backbone network should take 12 to 18 months.

As the backbone network is being put in place, the company will begin to funnel its data networks into the T-3 lines. System One's data networks currently support 100,000 terminals, which are linked to a variety of computers running different operating systems.

The company is leaning toward connecting its terminals through IBM's SNA protocols, which could make Texas Air's network the world's largest SNA net.

Texas Air is making a substantial investment to meet System One's networking needs, and the airline expects an eventual return on the investment. System One expects to generate \$380 million in revenue this year. □

User lauds SynOptic system

continued from page 2

develop such a product but also released few details.

Others working on similar projects include Micom-Interlan, Inc., which is working with SynOptics in a "technology transfer agreement," according to Micom-Interlan President Mike Barker. Ungermann-Bass, Inc. is actively pursuing Ethernet on unshielded twisted-pair cabling, according to a company spokesman.

Hewlett-Packard Co., which proposed in a recent IEEE 802.3 meeting that a study group be formed to look into Ethernet on telephone wire, is rumored to be working with it, as is Digital Equipment Corp.

According to SynOptics' beta user, New York-based LAN Systems, Inc., a local networking systems integrator, the PDS version of LatisNet overcomes the obstacles of emanation and attenuation that limit the usefulness of unshielded twisted-pair wiring for high-frequency data signals.

Attenuation, or signal loss, on telephone cabling becomes greater as the data rate increases, limiting the distance a signal can cover. The PDS version of LatisNet supports workstations up to 330 ft from a wiring closet. But according to Tyrone Pike, president of LAN Systems, which will also resell the product when it becomes available, LatisNet was able to sustain signal "well beyond" that maximum specified distance.

Emanation, or radio frequency interference (RFI) and electromagnetic interference (EMI), can affect the quality of a signal and is harder to control on unshielded twisted-pair wiring.

According to Pike, who has beta tested other vendors' approaches to running Ethernet over twisted-pair wire, SynOptics was very careful to keep EMI and RFI to a minimum. Other vendors just focused on getting their products to run on the wire, but SynOptics

made sure their network wouldn't interfere with others' equipment sharing the same conduit," he said.

In the beta test, Pike used LatisNet with wiring for Rolm Corp., NEC Corp. and AT&T private branch exchanges without any problems. "The real question is whether you get cooperation to do testing with the switch makers. SynOptics has," he said. "That's critical. Your switch maker could tell you that your warranty is null and void if the system you install interferes with its switch."

LatisNet conforms to the structured PDS wiring plan that specifies a hierarchical star topology. Workstations are attached to the network via transceivers, which connect to a modular telephone jack in the wall. Through two or four-pair twisted-pair wires, the workstation is linked to a local concentrator located in a wiring closet. Each concentrator can accept up to eight adapters. Each adapter contains up to eight ports, each of which supports a workstation.

Local concentrators are linked to a central concentrator in another part of the building via fiber-optic cabling, forming the star connection.

Each adapter includes proprietary electronics and a microprocessor for filtering data signals to limit EMI and RFI as well as to perform diagnostics. The concentrator also provides diagnostic capabilities, Pike said.

"The concentrator looks at the packet structure, and if it sees bad packets on the channel, it disconnects the individual link where the packets are coming from," he explained.

The concentrator continues to monitor the bad section of cable, and when it again sees acceptable packets, it will bring the connection back up.

"SynOptics worked from the assumption that the twisted-pair segments are going to be damaged and designed the system so that it could gracefully recover," Pike said. □

Bridge-3Com pact draws praise

continued from page 1

manager for medical instruments manufacturer Nellcor, Inc., based in Hayward, Calif. "Hopefully, we'll also see a hiking of wide-area communications expertise within 3Com," he added.

"3Com didn't have the connectivity we really need. Bridge did, and we like the direction Bridge is heading in," said DeAnne Vannice, administrator of information management and technical services/LAN project at GTM Midwest Telephone Operations. "It'll also make 3Com a lot bigger and more secure."

The merger, engineered in anticipation of future market consolidation, is intended to strengthen the combined firms' competitive position against long-term rivals AT&T and IBM. "We anticipate there will be consolidation in the marketplace, and we wanted to pick our own partner," said Bridge President William Carrico.

Bridge, based in Mountain View, Calif., is one of the three largest terminal-to-host networking vendors, and it provides links to wide-area networks. 3Com, based here, is one of the largest personal computer networking vendors. Both firms primarily offer networks based on Ethernet.

The merger, in which Bridge would become a wholly owned subsidiary of 3Com, would yield the largest independent networking vendor — one that supports multiple vendor computers — according to financial analyst Paul Sherer of Robertson, Colman & Stephens in San Francisco. Combined sales for the two firms will be about \$200 million in 1987, compared to 1987 revenue of Novell, Inc., \$180 million; Ungermann-Bass, Inc., \$150 million; and Network Systems, Inc., \$120 million, according to Sherer.

Sherer estimated the combined value of the outstanding stock of the two publicly traded firms at \$500 million — \$200 million for Bridge and \$300 million for 3Com.

In the stock swap, Bridge would receive 1.4 shares of 3Com stock for every Bridge share 3Com receives. Under the terms of the agreement, which must be approved by the shareholders, Carrico would become president and chief operating officer, 3Com President William Krause would become chairman and chief executive officer, and 3Com Chairman Bob Metcalfe would be senior vice-president of technology and serve on the board of directors of the merged company. Shareholders will vote on the merger at a special meeting scheduled for October.

Although both firms are confident that the merger will be completed successfully, 3Com has a history of failed merger attempts, and the two firms have held merger discussions off and on during the past several years without signing an agreement for shareholders to consider. "We've been trying to merge with Bridge for years," Metcalfe said.

That merger hasn't happened until now because it would have resulted in too many layoffs due to redundant jobs. "There will probably be some casualties, but on closer examination, we found we could keep it to a minimum," he said.

Fueling the merger, according to Carrico, is that large companies are ready to integrate their personal computer and departmental networks with corporate networks.

Distribution channel conflicts between Bridge and 3Com were also a motivation for the firms to reach an agreement. Because Bridge is an OEM for 3Com's 3+, its direct sales force competed for some of the same customers served by 3Com dealers.

"Our dealers are finding it increasingly difficult to refer customers to Bridge for broader communications needs because Bridge would step in and take over the account," Metcalfe said. "By merging, we can structure our selling relationships better." □



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